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Gastroenteric Disease in Swine

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THE CHEMICAL and physical degradation of feed stuffs, the absorption of the nutriment, and the discharge of waste are important functions of the stomach and intestine. For this reason, disease of these organs possesses a fundamental and ofttimes far-reaching significance with respect to the growth and development and the well being of the organism, in this case, the pig.

Gastrointestinal disturbances occur in different forms and types and from different causes. Some are quite simple and readily understandable while others are complex and unsolved. Satisfactory and rational treatments are available for certain of these diseases but less assurable remedies are forthcoming for others. Some of the ailments occur more commonly in pigs within rather definite age limits whereas others occur at most any time of life. Some of the gastroenteric disorders and dysfunctions are not attended by recognizable symptoms while others are characterized by unmistakable clinical and pathologic manifestations. Gastroenteric diseases that are distinctly sporadic can be contrasted with others that are distinctly enzoötic.

The diseases of the stomach and intestine to be described are neither new nor uncommon but are the ones that most frequently come to the attention of the veterinarian who offers his services to the owners of swine.

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DYSPEPSIA

A gastric disturbance, which from some viewpoints could be considered a simple disease without serious complications, is dyspepsia or indigestion. It is my belief that in most every herd of swine, mild and transient cases of dyspepsia come and go unnoticed. The causes in those instances may not be different from the causes in the cases which do come to our attention, the difference being merely one of degree.

The causes of dyspepsia are varied. For example, overloading the stomach with food; the consumption of spoiled food or water, acrid kitchen wastes, insecticides, weed eradicators, and other chemicals used in the treatment of seed grains (in sublethal amounts) are among the more common causes. Dyspepsia is usually a prominent symptom of many of the infectious diseases. Climatic changes play an important rôle as the cause of dyspepsia in very young pigs. This will be dealt with separately (*see* Dyspepsia in Nursing Pigs).

The symptoms of dyspepsia are those of distress. The pig becomes restless and uneasy. Nausea and vomiting are usually displayed. Cramplike pains in the abdomen are noted. The stomach is oftentimes filled with gas, causing a distention of the abdomen and the signs of dyspnea. Gas is eructated. There may be a patrial or complete anorexia. Constipation often occurs in the early phases of the attack, but it is sometimes initiated with a diarrhea. These are disturbing signs and attract the attention of the owner or caretaker. Where several or more of the swine are involved simultaneously, the anxiety of the owner as well

as that of the medical attendant increases proportionately. The diagnosis of a primary dyspepsia is aided materially when, by inquiry and inspection, one or more of the causative factors is disclosed.

The treatment must take into account the cause. Where the cause can be ascertained, one of the first procedures is to eliminate it. It is advisable that all food be withheld for a period of twenty-four hours and then the affected pigs are offered a steamed or scalded mash of millfeed or bran. Hydrochloric acid, 4 cc. per gallon of drinking water, is beneficial. This should be given only after feed has been consumed. Where a fermentive process is responsible for the disorder, one may administer bismuth subnitrate 0.5 to 1.0 Gm. or sodium salicylate 1.0 to 2.0 Gm. per 100 lb. pig and repeat in eight to ten hours.

DYSPEPSIA IN NURSING PIGS

A dyspepsia of enzoötic proportion occurs sometimes in pigs under 30 to 40 days of age. It is a functional dyspepsia that is brought about by sudden changes in atmospheric conditions, particularly where the environmental temperature decreases sufficiently to cause chilling of the body. It is relatively simple and benign and when the cause is removed, promptly subsides. Because of the sudden onset and the large number (60% of more) of pigs in this age group that are affected, the disturbance alarms the uninitiated, and gives the impression of being a highly contagious and rapidly spreading disease.

The history of an outbreak is similar to the following: The dyspepsia develops when the environmental temperature of the place where the pigs are being reared suddenly drops from a warmer to a cooler level and causes them to chill. Within a few hours of this change, the affected pigs show a digestive upset of lesser or greater degree. They shake and shiver and move about, tucked up in the flank. The hairs stand on end and the coat loses its sheen. The desire to nurse is impaired or abolished. Some pigs vomit. The most common symptom, next to the chilling, is a diarrhea. The character of the feces may be such as to be described as grey scours or even white scours. If the provocative conditions continue for twenty-four to thirty hours, the intensity of the ailment increases.

The progress of the disease can be checked and the existing functional disorder corrected by providing dry, and warm surroundings. The administration of some bland intestinal antiseptic—creolin (Pearson's) 5 parts, and mineral oil, 95 parts—as a palliative medical procedure, seems advisable under certain circumstances. The dose, 3 to 5 cc. per pig once a day for two or three days.

ASCARIASIS

The phase of the ascarid problem to be considered with the gastroenteric diseases is the postlarval or growth and mature phases of an infection with *Ascaris lumbricoides* var. *suis*. It is sometimes spoken of as intestinal ascariasis.

Very frequently, in fact much too frequently, there is not a sufficient number of roundworms present in the small intestine to cause systemic disturbances. While I have no definite answer as to the smallest number of worms necessary to produce clinical evidence of intestinal ascariasis, I am in a position to say that at the necropsy on many of these cases, the number of worms present, visible to the unaided eye, was often as few as 20. In fact, it seemed almost incredible to assess the relatively small number of worms as the responsible etiologic factor. On the other hand, one often finds large segments of the duodenum or jejunum so packed with ascarids that there is no doubt as to the ill effects produced upon the host.

The general physical condition of pigs affected with ascariasis is poor. They show much evidence of stunted growth and development. The coat is dry and shaggy; the skin harsh and "hidebound." The eyes are usually sunken in the orbits and the visible mucous membranes are blanched. The appetite is impaired. Vomiting is a symptom in a small percentage of the cases. Most of the affected pigs are constipated, but occasionally one finds that the stool is thin and foamy. Symptoms denoting a functional disturbance of the central nervous system, chiefly dizziness and vertigo, are sometimes manifested. Ascarid-infected pigs often rub and scratch their bodies against any available object which suggests an itching sensation.

It is obvious that the treatment should be directed to the removal of the worms. While removal is essential, it is important nevertheless that this should not be pursued too vigorously in heavily parasitized animals.

Oil of chenopodium is a valuable anthelmintic for ascarids. The dose for a 50-

pound pig is 2.5 cc. in 2 ounces of castor oil or mineral oil. It is important that all food be withheld for a period of at least twelve to twenty hours before treatment. For the heavily infected cases where the feed intake is small, the fast period is not so important, but it is advised that the standard dose be reduced one-half and repeated once or even twice, leaving an interval of twelve to sixteen hours between each medication.

Phenothiazine is a valuable drug for the removal of ascarids in swine. For pigs weighing from 25 to 50 lb., the dose of phenothiazine should be about 8 Gm. and for those between 50 to 100 lb., the dose is 12 Gm. The drug can be mixed with an amount of feed that will be readily consumed and then more feed can be offered. It is not necessary that the pigs be fasted before administering the medicament.

Hexylresorcinol is another drug which gives fairly satisfactory results in removing ascarids. One of the chief points in its favor is its low toxicity. For 50-lb. pigs, the dose of hexylresorcinol should be from 3 to 4 Gm. The efficiency of this drug increases with the length of the fast period. At least forty-eight and preferably seventy-two hours should lapse between the last feeding and the administration of the drug. It is also necessary to use a purgative about twelve to eighteen hours after the medication.

MACRACANTHORHYNCHIASIS

A very serious intestinal disease may result from the injury produced by the acanthocephalid parasite, *Macracanthorhynchus hirudinaceus* (thorn-headed worm). The natural habitat of this worm is the small intestine of swine and more particularly the jejunum. By its fixation to the intestinal wall, considerable local injury is usually produced. It attaches sometimes to the mucosa, sometimes to the submucosa and sometimes as deep as the muscular coats. The real damage results in an invasion of the area of attachment by pathogenic bacteria where they produce a locus of necrosis. When several of these worms are present, the effect may be an inflammatory disease of the gut that will be harmful to the host. These infected sites sometimes extend through the entire bowel coats and perforate into the peritoneal cavity. A fatal peritonitis may result.

Unfortunately, this parasite is difficult to remove by any medicinal agent known. Wright and Raffensberger[1] report the results of a series of disappointing trials. They employed various anthelmintics, *i.e.*, carbontetrachloride, tetrachlorethylene, nicotine, oil of chenopodium, and kamala. More recently Harwood, Jerstad, and Swanson[2] added phenothiazine to this list.

BALANTIDIASIS

An inflammatory disease of the bowel which is believed to be due to the infusorial protozoan ciliate, *Balantidium coli* var. *suis*, is described as balantidiasis. Although it has not been firmly established that this protozoan is the cause *sui generis*, still there are those who will incriminate them as the etiologic agent in many cases of intestinal disease. On numerous occasions, we have observed what we considered to be dense populations of balantidia in scrapings made from the diseased cecal and colonic mucosae of swine sick with enteritis. These findings seem to warrant a consideration of these protozoa as having an important, if not primary, rôle as the infective agent. On the other hand, we must profess a dissatisfaction in being unable, by present day histologic techniques, to demonstrate more consistently that these protozoa invade the intestinal epithelium and penetrate into the mucosa. It may all be that the protozoa elaborate or produce a substance which damages the epithelium making it unnecessary for them to invade the mucosa.

The symptoms of balantidiasis are not pathognomonic. Diarrhea is almost always present and it may be very profuse. The stool is either watery, mucus-like, or bloody. Because of the excessive diarrhea, dehydration of the body progresses rapidly. In those cases in which a large amount of blood is voided with the stool, the patient usually comes to a fatal ending within forty-eight hours. The diagnosis rests chiefly upon finding the protozoa in the feces.

A specific therapy for this disease has not been developed. Ray[3] suggests the use of a milk diet and states that it gives as good results as any internal medication. A milk diet, in the opinion of the writer, means that the food and water intake, so long as this diet is to be employed, should consist of nothing but milk. Whole milk is preferable, but since this is seldom available, skimmilk or buttermilk are satisfactory.

Not only should they receive milk but they should receive a quantity sufficient to be beneficial. This is a practice that has usually been neglected. A healthy and vigorous 50- to 70-lb. pig will consume 1 1/2 to 2 gal. of milk in twenty-four hours. Obviously, a sick pig will not take as much. The milk diet should be continued for at least six to eight days.

COCCIDIOSIS

This highly important protozoan disease exerts its most profound effect on pigs between the ages of 6 and 14 weeks. Older pigs, however, are not necessarily refractive. The disease is probably more common than is generally suspected.

The particular protozoa concerned are *Eimeria debliecki* and *Isospora suis*. The cecum and colonic parts of the large intestine are the principal parts of the bowel attacked but the jejunal and ileac parts of the small intestine are also favorable locations.

The clinical picture of coccidiosis is not significantly different from the other forms of inflammatory disease of the intestine. Marked dehydration and emaciation and a watery stool that is voided frequently are clinical signs of this disease that are displayed in a large proportion of the cases.

The lesions of coccidiosis, while not strikingly diagnostic *per se*, present certain characteristics which can be construed as highly suggestive. The walls of the affected parts of the gut are usually thickened and the ingesta in this area cling to the surface of the bowel. Further, the caseated membrane, more typical of infectious or necrotic enteritis, is not present. A catarrhal type of inflammatory reaction is not uncommon. The specific diagnosis, like that in the case of balantidiasis, depends upon the presence of coccidial oöcysts in scrapings from the mucosa or in the stool, demonstrable microscopically.

The treatment is not specific. The milk diet, as described in the paragraphs on balantidiasis, is also recommended as a therapeutic procedure with this disease. It has been the experience of Biester and Murray[4] that if the infected pigs can be housed or yarded in a cement-floored enclosure and the floor kept as free of fecal matter as is possible—washed off once each day at least—the opportunity for reinfection is minimized. This in turn is highly beneficial to the recovery of the patient. Where a program of this kind can be practiced, it is advised that it be done. Such a sanitation program is desirable when treating for any of the several forms of transmissible enteric disease.

INFECTIOUS ENTERITIS

The term infectious enteritis is being used to designate a serious inflammatory disease of the bowel, characterized by the development of diphtheritic and necrotic exudates that cover a greater or lesser portion of the mucosa in the cecum and colon in particular. This disease has been described by many different names, *i.e.*, necrotic enteritis, necrobacillosis, "necro," diphtheritic enteritis, bacterial enteritis, salmonellosis, pig typhoid, scours, and others. Of the gastroenteric diseases, infectious enteritis is the most important.

Bacteria of the genus Salmonella apparently are the principal etiologic agents. Organisms of this genus can be isolated from the intestine and lymph nodes draining the intestine in a very high proportion of the cases manifesting the characteristics of this disease. Further, the syndrome of this disease can be produced in susceptible pigs by infecting them artificially with pure cultures of Salmonella sp. and then recovering the organism from the diseased tissues. It must not be inferred, however, that it is readily reproducible because, many times, the exposed pigs fail to develop the clinical picture typical of the disease as it occurs under natural or field conditions. Except for *Actinomyces necrophorus*, the relationship of other microörganisms and of nutritional factors to the development of infectious enteritis is less perfectly understood. The necessity of further research along these lines is imperative.

Diarrhea is an almost ever-present symptom of this disease. It is the symptom that attracts the attention of the husbandman and convinces him that illness exists among the swine. The stool generally is of "pea soup" consistency, but sometimes becomes watery. Flakes and shreds of fibrinous and necrotic tissue are often passed with the feces. In some cases, considerable amounts of blood are voided. The affected pigs lose weight rapidly and their general physical condition becomes subnormal. The desire for feed and water is much reduced and often perverted. As a rule, one finds 20 per cent. or more of the herd affected when our services are sought. The pigs between

the ages of 2 1/2 and 5 months appear to be involved by this disease more than swine of other ages.

Before leaving the discussion of the nature and clinical characteristics of infectious enteritis, it is well to remember that a septicemic type of disease which is due to bacteria of the same genera often develops. It has been our experience as well as the experience of others, that when attempting to reproduce the syndrome of infectious enteritis with Salmonella sp. (3 to 5 cc. of a 24-hour broth culture) that within a few hours of the administration, some of the pigs develop a high fever (105 to 107 F.), refuse to eat or drink, and are markedly depressed. This continues for a day or two, whereupon they return to what appears to be a normal status. It seems reasonable to suspect that, in a small per cent. of the pigs, a similar acute phase of intoxication might occur under natural or field conditions and later manifest the characteristics of infectious enteritis.

The medical treatment of infectious enteritis, though considerably improved within recent years, nevertheless, has not been solved completely. The March, 1944, issue of *The North American Veterinarian* printed the replies of several practicing veterinarians who were requested to tell how they treated swine enteritis. The use of either whole oats or ground grains soaked in an alkaline solution to which sodium chloride was added at the rate of approximately 1 lb. to each bushel of grain was advocated by most of those reporting. According to information that we have been able to obtain, this treatment is in line with that advocated and employed by many veterinarians and for which they profess quite satisfactory results. "Two ounces of copper sulfate in each 20 gal. of drinking water is an old and tried treatment that is hard to improve upon" is an opinion expressed by one of the reporters. Another recommends very highly a preparation compounded with iron (sulfate), copper (sulfate), magnesium (sulfate), sodium chloride and charcoal. Nicotinic acid, 50 to 75 mg. per pig per day, along with a concentrated solution of sodium chloride mixed into an all-slop diet had its proponent. One of the reporters used sulfaguanidine in the *really* sick pigs and with very satisfactory results. Some of the reporters used bacterins in conjunction with the medical treatments in certain selected herds.

We have had the opportunity to employ some of the sulfonamides in the treatment of infectious enteritis as it occurred in the field. With few exceptions, a given number of pigs in each herd studied were allowed to go untreated. These constituted the controls and thus afforded an excellent opportunity to compare and evaluate the results of the treatment. Omitting the details of the investigation, a brief summary of the results is offered.

The first and most extensive investigation was made with sulfaguanidine. The results we obtained were very favorable. The doses which proved most valuable ranged from 0.75 to 1.5 Gm. per 10 lb. body weight per day. It is recommended that the first dose should be the full daily dose and for each subsequent day of treatment, one-half the daily dose should be given in the morning and one-half in the evening. As a rule, the treatment should be continued for at least six days. It has been observed on many occasions that pigs manifesting a severe diarrhea on the day the treatment was begun voided firm and formed stools on the third or fourth day of treatment. This is a good sign, but, unless the treatment is continued another two or three days, recurrence of the diarrhea will often follow and this must be interpreted to mean that complete recovery has not taken place.

The mode of administration of the drug depends upon the case to be treated. For pigs that are still taking feed voluntarily, the drug can be incorporated with it. Under these circumstances, it is desirable that the amount of medicated feed offered the pigs be less than the amount they might normally consume, thus assuring the intake of the drug. If more feed is desired it can be given after the medicated feed has been eaten. For those pigs that will not voluntarily take feed, it is necessary that they be given individual attention. The drug can be suspended in milk or water and administered *via* stomach tube or as a drench or given in the form of compressed bolets or in gelatin capsules.

The second of the sulfonamides which we employed in the treatment of this disease was sulfasuxidine. Favorable results were obtained with this drug. The daily dose should not be less than 1.0 to 1.5 Gm. per 10 lb. and this continued for at least six to eight days. The mode of administration is the same as described for sulfaguanidine.

Phthalylsulfathiazole (sulfathalidine) is

another of the sulfonamides that is especially adapted to the treatment of this enteric disease. While the number of swine treated with sulfathalidine is not as great as in the cases of sulfaguanidine and sulfasuxidine, the conditions under which the study was carried out were comparable. The results which have been obtained are very encouraging. The doses which gave the most favorable results ranged from 0.65 to 1.0 Gm. per 10 lb. per day. Here again, it seems advisable that the drug be administered for a period of at least six to eight days and the mode of administration similar to that described previously.

In connection with the treatment of a herd suffering with infectious enteritis, regardless of the choice of therapy, a workable program of sanitation and hygiene is highly desirable and should be put into effect as early as possible. If possible, confine the animals in a cement-floored enclosure and clean and wash the floor at least once each day. Where this can not be done, make every effort to remove the pigs to clean ground and move them again every few days into similar clean lots. It is important that the feed and watering utensils be moved often because the ground around them is an area where the pigs concentrate, thereby creating a place where the chances of reinfection are maximum.

The responsibility for the diagnosis of the gastroenteric diseases and for prescribing the course of treatment employed for their relief rests with the veterinarian, but the results obtained, either good or bad, often depend upon the ability of the client to follow instructions. Clients are sometimes dissatisfied with the services they receive from their veterinarians when, as a matter of fact, the fault lies in their failure to carry out the procedures inherent in the particular therapy prescribed.

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—U. S. Navy Photo

Unloading Veterinary-Corps-inspected food for U. S. Army troops in the Aleutian Islands.

Studies on Porcine Enteritis
1. Sulfathalidine Therapy in Treatment of Natural Outbreaks

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THE RELATIVE inabsorbability of certain of the sulfa drugs renders them particularly valuable as medicinal agents for the lower digestive tract in man and animals alike. Among these drugs, sulfaguanidine, succinylsulfathiazole (sulfasuxidine), and sulfathalidine (phthalylsulfathiazole) share this property.

Of these three drugs, sulfaguanidine has been employed rather extensively as a therapeutic agent in the treatment and control of enteric disorders of swine. Cameron and McOmie[1] determined that sulfaguanidine might be used safely in swine in doses as high as 1 Gm. per 20 lb. of body weight twice daily for at least five days. A year later, Cameron[2] reported favorably upon the clinical use of the drug in swine enteritis. The observations, however, were not controlled.

Kernkamp and Roepke[3, 4], in extensive field trials, quite definitely established the efficacy of sulfaguanidine in the treatment and control of swine enteritis. The effective dose was estimated to be within the range of 0.75 to 1.50 Gm. per 10 lb. of weight. To our knowledge, the use of succinylsulfathiazole (sulfasuxidine) in enteric disorders of swine has not yet been reported.

One of the newer of the enteric sulfa drugs is sulfathalidine, also known as phthalylsulfathiazole. Sulfathalidine, being relatively insoluble, is sparingly absorbed from the gastrointestinal tract and less than 3.5 per cent of the ingested therapeutic dose is said to be recovered from the urine of man (Poth[5]); the rest of the drug apparently passes through the digestive tract.

According to Mattis, Benson, and Koelle[6], sulfathalidine, when comprising from 2 to 5 per cent of the feed of rats for as long as thirty days, was found to be nontoxic. When given at the level of 10 per cent of the feed, the only toxic manifestation was a depression of growth. Monkeys given sulfathalidine in doses up to 5.0 Gm. per kilogram daily for thirty days showed no significant changes in the normal values of the various blood constituents and no histopathological changes attributable to the drug. Much lower concentrations of the drug were found to be toxic when given intraperitoneally. In an experimental study of 19 sulfonamide drugs in the dog, Poth and Ross[7] found sulfathalidine to be the most promising as an intestinal antiseptic because of its low solubility, its lack of toxicity, and its high bacteriostatic powers against the coliform organisms.

The present studies were undertaken to study the effectiveness of sulfathalidine as a therapeutic agent in the treatment and control of swine enteritis and dysentery. All of the trials were conducted in naturally-occurring outbreaks of the disease as they were encountered in the field.

Before the drug was used in any outbreak, the presence of enteritis was established by postmortem examinations of 1 or more typically affected live animals. Possible complications of hog cholera, swine erysipelas, and other primary swine diseases were eliminated as far as possible by appropriate laboratory and field procedures. The drug in the dosages selected was given either by mixing the material with the feed or by individual treatments. In nearly all cases, the usual high corn diet was substituted by one high in oats or barley. In most of the herds, representative affected animals were maintained without treatment to serve as controls. The effectiveness of treatment was determined by the relative livability and thriftiness of the treated animals as compared with the controls. In many of the herds, in addition, apparently healthy animals were treated with the drug to test the effectiveness of

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sulfathalidine in protecting unaffected animals in diseased herds against enteritis.

PRESENTATION OF DATA

The data accumulated in these studies are presented in protocol form and are subsequently summarized and condensed in tables 1, 2, 3, and 4.

Herd 1.—Two weeks after having been vaccinated with hog-cholera antiserum and virus and shipped several hundred miles in winter weather, enteritis appeared in a herd of approximately 200 hogs averaging about 150 lb. each. The use of anti-hog-cholera serum, mixed bacterins, and alkaline treatment failed to reduce the mortality. Forty-eight animals had succumbed and many of the survivors were scouring at the time sulfathalidine was administered. Of 63 clinically affected pigs treated individually with 4 Gm. of sulfathalidine daily for ten days, 53 apparently recovered. Three other surviving animals remained unthrifty while 7 died. In a second lot of 88 less severely affected pigs given sulfathalidine in the feed at the level of approximately 0.1 Gm. per 10 lb. of body weight for ten days, 71 recovered fully, 8 remained unthrifty, and 9 died. The more severely affected animals in this lot suffered from inappetence and it is thought that some of those which died may not have received medicinal quantities of the drug. Of 18 control animals continued on alkaline treatment, 8 became chronic cases, 9 died, and only 1 pig recovered fully.

Herd 2.—Forty-five animals out of a herd of 300 hogs had died of necrotic enteritis. Sick pigs on alkaline treatment were not responding. Of 50 clinically affected animals (50-60 lb.) given individual daily treatment for eight days with 6 Gm. of sulfathalidine, 46 recovered and 4 died. In a group of 10 similar pigs maintained upon alkaline compound only, 7 recovered and 3 died. In the same herd, none of 25 apparently healthy pigs receiving sulfathalidine at the level of approximately 0.16 Gm. per 10 lb. of live weight developed symptoms of enteritis. Observations on 10 additional pigs studied in this herd will be found in table 1. and 3.

Herd 3.—Following the serum and virus vaccination for hog cholera, losses from necrotic enteritis appeared in a herd of 350 small pigs. In a group of 25 clinically affected animals given individual daily treatment with 4 Gm. of sulfathalidine each for eight days, 17 recovered fully, 1 remained unthrifty, and 7 died. These pigs were quite sick at the time the treatment was begun and often vomited their tablets. Four out of 10 control pigs recovered fully, 1 remained unthrifty, and 5 died. In the same herd, out of 160 apparently healthy pigs given sulfathalidine in the feed at the level of 0.23 Gm. per 10 lb. live weight, 153 remained normal, 2 became unthrifty, and 5 died.

Herd 4.—One hundred forty-six feeder pigs

TABLE 1—Sulfathalidine Treatment of Pigs Affected with Clinical Enteritis, Clinical Pneumonia Not Present

HERD	NO. OF PIGS TREATED	NO. OF PIGS CONTROL	AV. WT. (LB.)	SULFATHALIDINE TREATMENT (GM. PER 10 LB. LIVE WT.)		OTHER TREATMENT	MORTALITY RECORD RECOVERED	MORTALITY RECORD UNTHRIFTY	MORTALITY RECORD DIED
1	63		150	0.27	daily, 10 days		53	3	7
	88		150	0.11	daily, 10 days		71	8	9
		18	150			Alkaline	1	8	9
2	50		50-60	1.10	daily, 8 days		46		4
		10	50-60			Alkaline	7		3
	2		250-300	0.36	daily, 8 days		2		
		2	250-300			Alkaline	2		
3	25		35	1.10	daily, 8 days		17	1	7
		10	35				4	1	5
5	69		60	0.27	daily, 8 days		60	7	2
		10	60				6	2	2
		5	15-35				2	1	2
6	5		50	0.40	daily, 5 days		5		
		3	50			Fish Oil	3		
7	71		100	0.40	daily, 8 days		69		2
		15	100				10	5	
8	30		50	0.80	daily, 6 days		28		2
		13	50				6		7
10	226		125-175	0.48	daily, 10 days		211		15
		2	125-175						2
12	7		30	0.66	every second day, 9 days		3		4
		8	30				1		7
13	35		90	0.22	daily, 10 days		29		6
16	12		250-400	0.40-0.64	daily, 5 days		12		
17	22		60	0.16	daily, 4 days		20		2
	2		200-250	0.10	every second day, 8 days		2		
	707	96					628	19	60
							42	17	37

(100 lb. average), vaccinated with serum and virus for hog cholera and shipped several hundred miles, developed enteritis. Many of the affected pigs suffered from secondary pneumonia. Thirty-five animals died between Oct. 22 and Dec. 9, 1943. Sulfathalidine therapy was begun on the latter date. Eleven out of 13 clinically affected pigs survived after being treated daily each with 4 Gm. of the drug for eight days. Two pigs died. Of 10 control animals 2 recovered, 4 died, and 4 remained unthrifty. Eighty apparently healthy pigs in the same herd, given sulfathalidine in the feed at the level of 0.2 Gm. per 10 lb. of live weight, remained free from clinical enteritis.

Herd 5.—Illness was present in a few of 177 pigs (15-60 lb.) at the time of the serum and virus inoculation for hog cholera. A severe outbreak of enteritis followed. One week later, approximately half of the animals were affected and 30 had died. Of 69 unthrifty 60-lb. animals treated with sulfathalidine in the feed at the level of 0.25 Gm. per 10 lb. of live weight, 60 recovered fully, 7 remained unthrifty, and 2 died. Six of 10 untreated controls recovered fully, 2 remained unthrifty, and 2 died. Of 52 apparently healthy smaller pigs (15-35 lb.) treated individually with 2 Gm. of sulfathalidine daily for eight days, 41 recovered fully, 10 became unthrifty, and 1 died. Of 5 affected pigs in the same group maintained as controls, 2 recovered, 2 died, and 1 remained unthrifty.

Herd 6.—Bloody dysentery appeared in a herd consisting of approximately 75 old sows and 200 shoats. The morbidity was high but the mortality low. Five clinically affected pigs (50 lb.), receiving 2 Gm. of sulfathalidine each for five days, recovered fully. Three similar pigs treated with fish oil recovered also although it was thought that this group responded less rapidly than did the former lot. Fifty-seven apparently healthy pigs of the same size, given sulfathalidine in the feed at the level of 0.3 Gm. per 10 lb. of live weight, remained unaffected with dysentery.

Herd 7.—Five hundred (100 lb.) pigs, immunized against hog cholera and shipped several hundred miles, developed necrotic enteritis. Seven died during the first four days after the appearance of the disease. Seventy-one clinically affected pigs were given 4 Gm. of sulfathalidine each daily for eight days. Of these, 69 survived and 2 died. In a group of 15 similar pigs maintained as controls, 10 recovered fully and 5 remained unthrifty.

Herd 8.—Necrotic enteritis appeared in a group of 50-lb. hogs purchased at a sales barn. In a lot of 30 clinically affected animals given 4 Gm. of sulfathalidine daily for six days by individual treatment, 28 recovered fully and 2 died. Scouring ceased by the third day. Of 13 similar control animals, 6 recovered and 7 died. None of 70 apparently healthy pigs in the same herd, given 2 to 4 Gm. of sulfathalidine in the feed daily for six days, developed clinical enteritis.

Herd 9.—Illness was observed in a small number of pigs out of a herd of 177 (40-50 lb.) at the time of the serum-virus inoculation for cholera. A severe outbreak of enteritis followed. In a group of 62 clinically affected animals, each treated daily with 2 Gm. of sulfathalidine for eight days, 31 survived but remained unthrifty, and 31 died. Of 20 similar pigs maintained as controls, 19 died and 1 survived in a stunted condition. Many of these pigs suffered severely from pneumonia. Of 76 apparently healthy pigs given sulfathalidine in the feed at the level of from 0.32 to 0.4 Gm. per 10 lb. of live weight, 73 remained

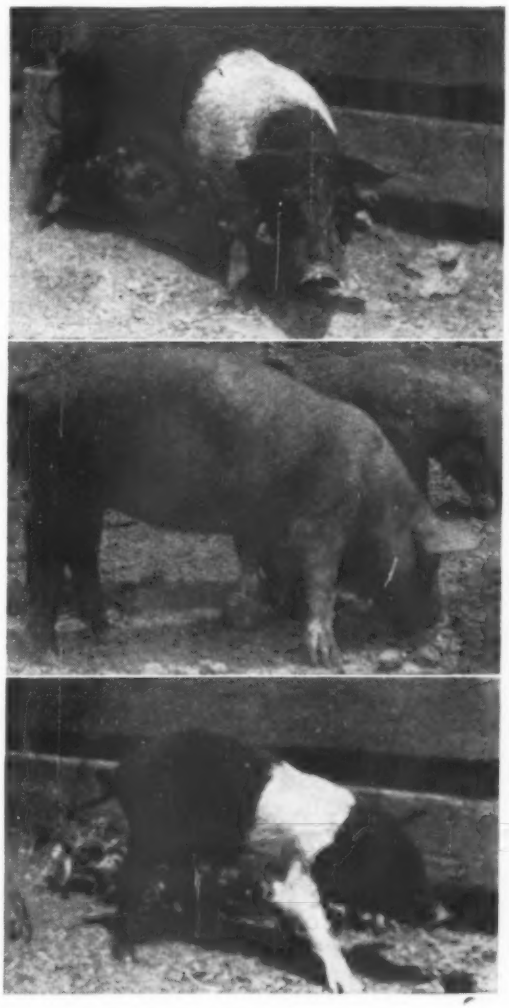


Fig. 1—Sulfathalidine therapy in porcine necrotic enteritis: (upper) recovered following daily treatment; (middle) fed sulfathalidine as prophylactic, and remained healthy on contaminated premises; (lower) untreated control.

normal and 3 died. See figure 1 for illustration.

Herd 10.—In an outbreak of enteritis in a large swine herd, 20 pigs died from April 25 to May 20; 40 died from May 21 to May 27, and 7 died the day of May 28. Sulfathalidine therapy was begun May 29 and continued for eleven days, the dose being 6 and 8 Gm., respectively, for pigs weighing under and over 150 lb. Out of 226 treated animals 211 survived while 15 died. Only two deaths occurred in this group after the third day. Both of two untreated controls died.

Herd 11.—Twenty-six out of an original herd of 43 pigs were affected with enteritis. Eighteen affected animals (75-130 lb.) were treated individually, each with 8 Gm. of the drug over a period of three days. Eight of these animals died and most of the survivors were unthrifty. Four of the 8 untreated control animals died, the remaining 4 surviving in a stunted condition. Most of these pigs suffered from secondary pneumonia.

Herd 12.—Seven scouring 8-week-old pigs were treated each with 2 Gm. of sulfathalidine in capsules every second day for nine days. Four died and 3 recovered. Of 8 similar pigs maintained as controls, 7 died and 1 recovered.

Herd 13.—Enteritis appeared in a herd of 150 (90-100 lb.) pigs. Ten had died at the time treatment was initiated and approximately one third of the herd was affected. Twenty-five clinically affected animals were treated each with 2 Gm. of sulfathalidine daily for eleven days, the drug being placed in soaked oats. A remarkable improvement was noted in the condition of these animals after the 4th day and 20 of them recovered. It is believed that some if not all of the 5 animals which died suffered from inappefence and did not, therefore, receive their full allotment of the drug.

A second lot of 10 similar animals later was treated in the same way and for the same period of time. One animal died from this group; the results were regarded as satisfactory.

Herd 14.—Seventy healthy pigs, in a herd where losses from enteritis were occurring, were treated with sulfathalidine mixed with the feed at the rate of 0.32 Gm. per 10 lb. daily for fourteen days. One animal died in this group, the rest of the lot surviving as thrifty animals.

Herd 15.—In an outbreak of hemorrhagic enteritis, 8 pigs (130 lb.) were treated individually with sulfathalidine at the rate of 2 Gm. per day for five days. Seven pigs recovered, while 1 died. One out of 7 control pigs died. Both pigs which died showed lesions of pneumonia.

TABLE 2—Sulfathalidine Treatment of Pigs Affected with Clinical Enteritis, Pneumonia Present

No. of Pigs						Other	Mortality Record			
Herd	Treated	Control	Av. Wt. (lb.)	Sulfathalidine Treatment (Gm. per 10 lb. live wt.)		Treatment	Recovered	Unthrifty	Died	
9	62		40-50	0.45 Gm.	daily 8 days			31	31	
		20	40-50					1		19
11	18		75-130	0.15-0.27 Gm.	daily, 4 days			10	8	
		8	75-130			Bacterin		4		4
15	8		130	0.15 Gm.	daily, 5 days		7		1	
		7	130				6			1
4	13			0.40 Gm.	daily, days		11		2	
		10	100				2	4		4
	101						18	41	42	
		45					8	9		28

Herd 16.—Severe losses had been experienced from enteritis in this herd. The owner was forced to sell some of the animals at a sacrifice in an effort to control the infection in a group of sows, many of which were approaching farrowing. Twelve clinically affected sows, varying in weight from 275 to 400 lb., were treated individually, each with 16 Gm. of sulfathalidine daily, for five days. All responded satisfactorily.

Herd 17.—Twenty-two clinically affected, unthrifty and listless pigs were treated each with 1 Gm. sulfathalidine as a drench daily for four days. The pigs averaged 60 lb. Two of the animals died the day following initial treatment. The remaining 20 animals improved in appetite, activity, and clinical appearance and made satisfactory recoveries. During the course of the observation, 2 hogs on the farm, weighing from 200 to 250 lb., suffered from acute attacks of bloody scours. Each promptly recovered upon being treated individually with 2 Gm. of sulfathalidine every second day for eight days.

Herd 18.—These pigs varied from 17 to 275 lb., consisted of a miscellaneous grouping of 32 animals originating from various field outbreaks of enteritis and were brought to the laboratory for special studies. Of these, 25

were treated daily with sulfathalidine in doses varying from 0.22 to 1.5 Gm. per 10 lb. of weight for from three to five days. Nineteen of these animals recovered while 6 died. Of the 7 controls, 2 recovered and 5 died.

Herd 19.—This herd, all suffering from enteritis, consisted of 50 experimental animals in the swine herd of the University of Illinois, College of Agriculture. These pigs varied in size from 2 to 400 lb. They were treated daily with individual dosages of sulfathalidine varying from 0.22 to 1.30 Gm. per 10 lb. in weight for from two to seven days. Of the 50 animals, 45 recovered and 5 died. There were no controls.

The data on the sulfathalidine therapy in the 19 herds of swine in which studies were undertaken are summarized in tables 1, 2, and 3. Table 4 is a general summary of all results obtained.

TABLE 3—Sulfathalidine Treatment of Apparently Normal Pigs in Herds Where Outbreaks of Enteritis were Present

Herd	No. of Pigs		Av. Wt.	Sulfathalidine Treatment		Mortality Record		
	Treated	Control	(lb.)	(Gm. per 10 lb. live wt.)		Recovered	Unthrifty	Died
2	25		100	0.16 Gm.	daily, 8 days	25		
	6		250-300	0.33-0.40 Gm.	daily, 8 days	6		
3	160		35	0.23 Gm.	daily, 8 days	153	2	5
4	80		100	0.19 Gm.	daily, 8 days	80		
5	52		25	0.80 Gm.	daily, 8 days	41	10	1
8	70		70	0.28-0.57 Gm.	daily, 6 days	70		
9	76		40-50	0.32-0.40 Gm.	daily, 8 days	73		3
14	70		50	0.32 Gm.	daily, 14 days	69		1
13		125	90		NONE		113	12
	539					517	12	10
		125					113	12

Discussion

When enteritis appears in a herd, treatment with sulfathalidine or other drugs should be regarded as supplementary to other measures of proved benefit. Among these is a change in feed from the usual high corn diet to one consisting primarily of bulky feeds such as oats and barley. Many veterinarians recommend that the oats or barley be soaked, but this point is controversial. Our observations indicate that losses from swine enteritis are aggravated by the development of secondary pneumonia and that good housing and care such as minimize the development of pneumonia greatly facilitate the control of enteritis.

In table 1 are summarized the results of sulfathalidine therapy in 11 herds of swine including 779 clinically affected animals, 96 of which were maintained as controls. Secondary pneumonia was not regarded as an important complication in any of these herds. The survival rate (table 4) was more than twice as great among the treated groups as among the controls while the mortality and the percentage of pigs surviving in a stunted condition were approximately four and one-half and six and one-half times as great, respectively, in the control groups as in the treated animals. In all 9 herds where controls were maintained, the survival and mortality figures are in favor of the treated groups. Results were regarded as particularly favoable in herds 1, 10, and 13. Even though control animals were not maintained in the latter herd, the effect of treatment in suppressing the outbreak was striking and entirely satisfactory to both owner and veterinarian in charge.

In table 2 is shown the effect of sulfathalidine therapy in 146 clinically affected pigs in four herds where pneumonia was prominent in the disease syndrome. Sulfathalidine therapy was shown not to affect the mortality rate (table 4) although it did influence the survival of stunted pigs—an effect of doubtful value. An inspection of the first four entries in table 4 emphasizes the great importance of controlling pneumonia in outbreaks of swine enteritis. The prognosis with or without treatment is much less favorable when pneumonia is present.

In table 3 is shown the effect of sulfathalidine therapy in 539 apparently healthy animals in 7 herds in which enteritis was present. In each herd, these animals were isolated from the sick and prophylactically treated with sulfathalidine mixed with the feed in the doses indicated. These observations were not properly controlled as all the untreated animals were in a separate, sin-

gle herd. The high survival rate of the treated pigs when considered in contrast to the incidence and mortality from enteritis experienced in each of these herds strongly suggests, however, the value of sulfathalidine in protecting apparently normal swine in infected herds from enteritis.

In the majority of the cases where sulfathalidine therapy was used, an improvement in the clinical condition of the animal was noted as early as the first day following treatment. In 51 instances where the temperature was 103 F or more at the time treatment was begun, the thermometer recording had decreased 0.1 or more degrees in 46 or 90 per cent of the animals after one day. An improvement in the appetite and a change in the character of the feces was usually noted on the second or third day and was often marked by the fourth day. Herds 18 and 19 are of special interest in this respect. All of these animals were under the constant supervision of experienced clinicians and the improvement following sulfathalidine therapy was, in most cases, unmistakable.

Several of the pigs in herd 19 were suckling pigs affected with scours. Although controls were not maintained, sulfathalidine therapy in the opinion of the clinician and the experienced herdsman was markedly effective in controlling the enteric disorder. Similarly favorable results in the sulfathalidine treatment of baby pig scours was obtained in herd 12 (table 1).

Herd 19 is significant also from another standpoint. In many instances, the scouring in these pigs was associated with the feeding of experimental diets known to be deficient in one or more respects. Sulfathalidine therapy tended, temporarily, to improve the condition in these pigs, but unless the ration was changed, relapses frequently followed withdrawal of the drug. This observation suggests that where the ration is defective, no permanent improvement can be expected from therapy.

Sulfathalidine in powdered form may be conveniently and satisfactorily given in the feed. It should be mixed with dry feed, for, according to the manufacturer, the drug is hydrolyzed in the presence of water to sulfathiazole which, in contrast to sulfathalidine, is absorbed to a considerable extent from the gastrointestinal tract. When the drug is mixed with the feed, the pigs should be watched carefully and those animals observed not to be eating normally should be removed and dosed individually. Some pigs may vomit the tablets or boluses.

TABLE 4—Summary of Results from Tables 1, 2, and 3 and Herds 18 and 19

	No. of Pigs	Recovered		Unthrifty		Died	
		No.	Per cent	No.	Per cent	No.	Per cent
Clinically affected pigs Sulfathalidine treated ..... 707 Pneumonia absent	707	628	88.8	19	2.7	60	8.5
Clinically affected pigs Controls ..... 96 Pneumonia absent	96	42	43.7	17	17.7	37	38.6
Clinically affected pigs Sulfathalidine treated ..... 101 Pneumonia present	101	18	17.8	41	40.6	42	41.6
Clinically affected pigs Controls ..... 45 Pneumonia present	45	8	17.8	9	20.0	28	62.2
Miscellaneous infected Animals ..... 25 Sulfathalidine treated Herd 18	25	19	76.0			6	24.0
Miscellaneous infected Animals ..... 7 Controls, Herd 18	7	2	28.6			5	71.4
Clinically affected pigs Sulfathalidine treated ..... 50 Herd 19	50	45	90.0			5	10.0
Apparently normal animals in infected herds..... 539 Sulfathalidine treated	539	517	95.6	12	2.2	10	1.9
Apparently normal animals in herd 13..... 125 Controls	125	113	90.4			12	9.6

Total pigs included in study, 1695.

In that case, it has been observed that a liquid drench is retained by the animal more satisfactorily than tablets, boluses, or capsules.

In clinically affected animals, sulfathalidine was administered in dosages varying from 0.11 to 1.10 Gm. per 10 lb. of live weight. The lower dosages of the drug seemed to be as effective as the higher. We would suggest, therefore, that until further information is available, the therapeutic dose of the drug be regarded as ranging from 0.25 to 0.50 Gm. per 10 lb. of live weight. The smaller dosages seem satisfactory for adult animals but larger amounts may be desirable for growing swine. For suckling pigs, the upper limit of the dose range given may have to be exceeded. Since the cost of a drug often limits its use in the veterinary field, the smaller the dose which can be employed with efficacy, the greater will be its usefulness. Thus, more information is desirable on the standardization of the dose of sulfathalidine.

SUMMARY AND CONCLUSIONS

Of 707 pigs affected with clinical enteritis in natural field outbreaks of swine enteritis and treated with sulfathalidine in dosages varying from 0.11 to 1.10 Gm. per 10 lb. of live weight for from four to ten days, 628 or 88.8 per cent made satisfactory recoveries. Seventy-nine or 11.2 per cent of the animals either died or remained unthrifty. Pneumonia was not an important manifestation in any of these pigs.

Of 96 similarly affected, but untreated pigs in the same herds, 42 or 43.7 per cent recovered satisfactorily while 54 or 56.3 per cent either died or survived in an unthrifty condition.

Of 101 sulfathalidine-treated pigs affected with clinical enteritis in natural outbreaks where pneumonia was a prominent manifestation of the disease syndrome, 18 or 17.8 per cent made a satisfactory recovery while 83 or 82.2 per cent either died or failed to recover fully. The same proportionate figures were obtained from observations on 45 similar untreated control animals in the same herds.

Of 539 sulfathalidine-treated but apparently healthy animals in herds where outbreaks of swine enteritis occurred, 517 or 95.6 per cent remained healthy, while 4.1 per cent either died or became unthrifty.

As a result of these studies, it is conclusive that sulfathalidine has merit in the treatment and control of swine enteritis when the disease is not complicated with pneumonia. When administered to pigs suffering from pneumonia in addition to enteritis, the drug often improved the enteric condition as judged by the character of the feces, but the pneumonia was not arrested and the mortality was affected but little if any.

It is concluded further that sulfathalidine has merit as a prophylactic agent against swine enteritis when administered to apparently healthy animals in affected herds.

For pigs from weaning age to adult size, the daily therapeutic dose of sulfathalidine, until clinical improvement is noted, is estimated to be from 0.25 to 0.50 Gm. of the drug per 10 lb. of live weight. The smaller dosages per unit weight are suitable for adult animals, while the larger dosages may be more desirable for lighter pigs. Suckling pigs may require more than 0.50 Gm. of the drug per 10 lb. of weight.

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Objections to artificial insemination of animals on the ground that it may deteriorate the race concerned is not valid in the face of similar practices with plant life.

"300 Farmers Do Own Vaccinating," is the three-column headline of an article in *Drug Topics*, telling how the Hooker Drug Company of Pleasant Hill, Mo., started farmers "vaccinating their own animals."

Panel Discussion on Swine Diseases

At the Chicago Session of the Association in August, 1944, swine diseases were presented in the form of a "Panel Discussion on Swine", which was directed by Dr. Frank Breed of the Norden Laboratories and staged by the members whose papers are published herewith.—Editors.

Nutritional Deficiencies in Swine

H. E. BIESTER, V.M.D.

Ames, Iowa

QUESTION—*How do you explain the cause of incoördination in pigs that are fed grains and protein supplement while on pasture?*

ANSWER — The foundation of posterior incoördination in pigs is faulty feeding of the sow during gestation and lactation, or even preceding conception. The feeding of grain rations to breeding stock on drylots without grasses or legume-hay meal is a cause of abortion, weak and malformed offspring, and stillborns. Suitable pastures, sunshine, grain, and protein and mineral supplements are required to store the essential elements needed to form normal embryos and pigs. Breeding stock raised experimentally on rations high in proteins and minerals, without the grass-juice factors, produce pigs showing advanced microscopic degeneration of the ovaries and testicles, rendering them worthless as potential breeders. Both males and females should be kept on pasture and given well-balanced, nonfattening rations several or more months prior to breeding. A substitute for pasture is not less than 15 per cent of good alfalfa meal. Feeding sows properly prior to conception and during lactation, and giving the pigs the four essentials of nutrition up to 70 lb. produces hogs that can be fattened on drylot feeding without breaking down. Pasture for sow and litter lays down the foundation that enables swine to grow on a high grain ration without grasses, whereas, pigs raised on drylot feeding before weaning fail to develop on the same ration.

From the Panel Discussion on Swine, eighty-first annual meeting, American Veterinary Medical Association, Chicago, Aug. 22-24, 1944.

Q.—*Does the mineral composition of crops grown on the same soil from year to year vary, and can the tables of average analyses of feeds be relied upon in computing rations for swine?*

A. — Yes, the mineral composition of the grasses and grains grown on the same land in successive years may vary considerably, depending upon the amount of rainfall and its distribution during the growing season. Soil fertility is also important in the mineral composition of feeds. Calcium and phosphorus are the chief constituents involved. As a general rule, high rainfall causes the calcium of grasses to fall below the average while the phosphorus increases. Conversely, during droughts the calcium of the grasses rises and the phosphorus decreases, which gives rise to phosphorus deficiency in range animals not fed supplements.

The four essential feed components are: (1) grains, (2) protein concentrates, (3) minerals, and (4) pasture or alfalfa meal. If they are supplied in accordance with the basic rules, a variation in the mineral content of the grains or grasses would not completely unbalance the ration. The usual cause for the appearance of nutritional disorders or poor growth is the direct violation of one, two, or even three of the cardinal rules for compounding a sound ration. The only exception occurs when proteins of vegetable origin are not supplemented with sufficient calcium.

Q.—*Is enteritis caused by nutritional deficiency?*

A.—The question cannot be answered by yes or no because of the large volume of

controversial literature. It also would be necessary to discuss separately the question as it relates to hemorrhagic dysentery and to the suipestifer type of enteritis.

It is my opinion that there is no specific etiological relationship between faulty nutrition and the two major forms of swine enteritis. The relationship is one of coincidence, *i. e.*, poor sanitation on the farm is associated with necrotic enteritis and these also are invariably associated with poor husbandry—drylots and poor feeding practices, or inadequate nutrition. In the past, I have emphasized that the excellent results obtained by following the "McLean County System" are due to the improved sanitation and improved nutrition that accompanies it.

When pigs were placed on fairly clean drylots or on concrete floored pens and fed deficient rations, experimentally, we produced clinical malnutrition but it was never associated with either of the two major forms of enteritis.

Regardless of what "intestinal antiseptics" are used, the conditions that caused the appearance of the disease must be removed if they are to be given a fair chance to act.

The veterinarian who prescribes a drug for enteritis is not being fair to the treatment, to himself, or his client when he does not insist on a change of lots and a clean pasture for the pigs at the time of treatment.

Obviously, when additional vitamins are added to the ration of a pig suffering with both enteritis and malnutrition, it is not surprising that growth is accelerated, if the factor added was missing.

Q.—*In what feeds is vitamin D found?*

A. — Plant materials are almost negligible sources of vitamin D. When hay or grain is exposed to sun, it acquires a limited amount of the D factor but not sufficient to adequately supply the needs of the pig. Under these conditions, when vitamin D is acquired by exposure of feeds to the sun, the vitamin A content of these is reduced or destroyed.

The only substantial or reliable sources of vitamin D are the sun, acting directly on the animal body, irradiated yeast, and fish oils.

Q.—*What is wrong with a ration consisting of equal parts of yellow corn and oats?*

A. — This ration violates three of the four rules for the preparation of a sound ration. The ration is low in digestible proteins and calcium, and possibly low in phosphorus, if feed is derived from land of poor mineral availability or grown during a poor season. If the animals are kept on a drylot, the fourth requirement for a complete ration, alfalfa meal or preferably pasture, is missing.

It is possible by means of corn and oats to fatten pigs for market after they have reached 70 lb. or more if they have had a complete ration since farrowing, and the sow likewise during the gestation has been fed a ration containing the four essential ration components. However, more economical gains while fattening or feeding for market can be obtained when a limited protein supplement and alfalfa meal are included.

Q.—*Assume that in the fall a client has brood sows that he wants to keep for April farrowing. He has on his farm corn, oats, and soybeans. What would be your suggestion as to balancing the ration?*

A.—Brood sows should be given all the pasture available before the winter begins. The grains constitute the first part of the ration. The soybeans (I presume extracted to form meal) supply the second essential part of the ration, *i. e.*, the protein concentrate, but being a plant material it is deficient in calcium which makes it necessary to include calcium carbonate. Unextracted soybeans contain too much fat (17%).

Heat extraction also increases the digestibility of soybean proteins. When the pasture season ends, not less than 15 per cent of a good grade of alfalfa meal should comprise part of the ration. If at all possible, some part of the soybean meal should be supplemented by a protein concentrate of animal origin in this case.

Probably of greatest importance is that when the pasture is unavailable, not less than 15 per cent of the ration should consist of alfalfa meal of good quality.

Q.—*What are the chief differences between plant and animal protein concentrates?*

A.—Plant protein concentrates are low in calcium and relatively high in phosphorus, whereas, those of animal origin are high in both Ca and P. That is a gen-

eral rule. Plant protein concentrates always require Ca supplementation.

Animal protein concentrates are usually qualitatively superior and contain some protective properties not found in those of plant origin.

Q.—*How does the mineral content of tankage and soybean-oil meal compare?*

	Ca%	P%
Tankage (50% Digestible protein)	7.21	3.85
Soybean-oil meal (42.4% protein)	.28	.66
Linseed-oil meal (30.6% protein)	.33	.86

Q.—*Is it possible to have a calcium deficiency in swine with no evidence of bone lesions?*

A. — It is possible for pigs to show an apparently normal appearance of the long bones in the presence of mineral deficiency. However, when the examination is continued further and directed to the sternocostal articulations and also to the vertebrae, it will be found that the vertebrae are red on the cut surface. The bone is soft and easily cut with a sharp, hand ax. The chips removed can be broken or cut with cartilage shears. When mineral deficiency is suspected, the vertebrae and the short bones should be examined when no changes are present in the long bones.

Hog-Cholera Tissue Vaccine (B.T.V.)

W. H. BOYNTON, D.V.M.
Berkeley, California

QUESTION—*What are hog-cholera vaccines? What methods are used in testing their safety, purity, and potency, and what are their properties?*

ANSWER—Hog-Cholera Tissue Vaccine (B.T.V.) is a finely ground 20 per cent suspension of certain cholera infected tissues in which the hog-cholera virus has been modified through the agency of eucalyptol and a period of incubation at 37.5 C.

Crystal-Violet Vaccine (Blood Origin) is composed of eight parts of defibrinated hog-cholera virus blood. The hog-cholera virus is modified by the addition of one part of a 0.5 per cent aqueous solution of pure crystal violet and one part of an aqueous 3.0 per cent solution of pure anhydrous dibasic sodium phosphate. This treated blood is then incubated at 37.5 C. for a period of time.

These vaccines are subjected to safety, purity, and potency tests according to government regulations. Upon satisfactory test, they are considered safe to use as immunizing agents against hog cholera.

These tests are conducted in the same manner for both vaccines. Twelve healthy pigs, from the same farm if possible, are selected. Seven pigs are injected with 5 cc. each, of vaccine, 2 with 3 cc. each, and 3 serve as controls. The 12 pigs are placed in a suitable pen and held for at least three weeks. The pigs on test are properly cared for during the three-week holding period. Their temperatures are taken and recorded and they are observed daily.

At the time the pigs are put on the safety and potency test, 2 healthy pigeons and 2 healthy guinea pigs are injected subcutaneously with 1 cc. each, of the vaccine. The pigeons and guinea pigs are observed for ten days following injection with vaccine and should be apparently normal at the expiration of the test, to constitute a satisfactory purity test.

Three weeks or more after receiving the vaccine, the vaccinated pigs with the controls are removed from the test barn to the virus barn and each is inoculated with 2 cc. of hog-cholera virus. Not more than 2 of the pigs treated with the 5-cc. dose of vaccine may be excluded from the test before the virus injection is given if considered unsuitable.

A satisfactory potency test will conform with U. S. Bureau of Animal Industry Regulation 276 and amendments, as applied to the interpretation of potency tests on hog-cholera antiserum, with the following modifications:

a) When all of the pigs receiving 5 cc. of

From the Panel Discussion on Swine, eighty-first annual meeting, American Veterinary Medical Association, Chicago, Aug. 22-24, 1944.

vaccine are well at the termination of the fourteen-day test period.

b) When both of the pigs receiving 3 cc. of vaccine remain well but one of the pigs receiving 5 cc. becomes sick and dies during the test period.

c) Two of the 3 control pigs must develop cholera and die, or when killed for virus, show characteristic lesions of cholera.

Information on the test conforming with the above definition will be submitted on V.S. form 100 for Bureau consideration and disposition.

The properties of hog cholera vaccines are:

a) They are free from disease-producing virus.

b) When injected into susceptible swine they will produce immunity against hog-cholera virus.

c) These vaccines are purely prophylactic and require a period of at least three weeks to induce a satisfactory immunity against hog cholera.

d) The injection of these vaccines does not produce any noticeable systemic reactions.

QUESTION—*To what restrictions should the use of hog-cholera vaccines be subjected?*

ANSWER—*a*) These vaccines should be used on healthy swine.

b) Vaccine treatment should be given preferably two weeks or more after weaning, except on some farms where it might be desirable to give a vaccination before weaning, in which case a second vaccination should be given two or more weeks after weaning.

c) Properly sterilized instruments and equipment should always be employed and aseptic precautions observed when injecting the vaccines.

d) Vaccinated pigs should be protected against exposure to hog-cholera virus for at least three weeks.

e) These vaccines should not be used on sick hogs.

f) Tissue vaccine may be used with a suitable dosage of serum on recently purchased pigs, with a questionable history, or in the face of known exposure to hog cholera. The serum-vaccine treatment is to be followed in about thirty days with a second injection of the vaccine alone.

g) Vaccine alone should not be used where exposure to hog cholera is probably within three weeks of vaccination time.

h) Pigs treated with these vaccines should not be in contact with pigs recently vaccinated with serum and virus for at least three weeks after vaccination.

i) Pigs raised on garbage-feeding establishments may be successfully immunized with hog-cholera vaccine if suckling pigs are treated with vaccine when about 5 weeks of age and given a second injection of vaccine two weeks after they are weaned.

j) Feeder pigs to be placed on garbage feed, if not over 60 lb. in weight, may be protected from hog cholera by administering 30 cc. of serum and 5 cc. of vaccine, to be followed by a second dose of vaccine alone in about thirty days.

k) These vaccines should be used with the understanding that additional vaccination is necessary for animals held over as breeders.

QUESTION—*What duration of immunity may be expected following the administration of hog-cholera vaccines under varying conditions?*

ANSWER—*a*) Pigs treated with hog-cholera vaccines two weeks or more after weaning are considered to be immune to cholera infection until they have reached marketing age. If kept beyond this period, they should be given a second injection. Breeding animals which have received two injections of vaccine should be retreated once a year.

b) Experimental trials have shown that one 10-cc. injection of tissue vaccine gave full protection against hog-cholera virus inoculation up to four months. Tests on this large dosage of vaccine were not carried for a longer period.

c) Experiments on one 5-cc. injection of tissue vaccine protected pigs up to eight months. Tests were not carried for a longer period. The immunity induced by a single 5-cc. dose appeared to be somewhat less complete six or eight months after vaccination than it was in the earlier periods.

d) In experiments on the effect of the simultaneous use of hog-cholera antiserum and tissue vaccine, not over 30 cc. of serum was used with 5 cc. of vaccine. Thus, one would have to consider the size of the animal on which this simultaneous method could be used.

From these experiments, it seems plain that some active immunity may be expected in animals thus treated for a period of three months. In problem herds

where the serum-vaccine combination is used, it would be advisable to give a second injection of vaccine in four or more weeks, or as soon as the animals appear healthy.

e) Field trials on the immunity of 140 pigs assembled from 38 farms, which had been vaccinated in the field by practicing veterinarians with a single 5-cc. dose of tissue vaccine. These pigs were from herds of varying histories; some of the animals represented herds free from trouble; others had a history of losses from various causes in previous years. The time between vaccination and immunity tests varied from approximately one month to one year. The 140 pigs on test and eleven unvaccinated controls were each inoculated with 2 cc. of hog-cholera virus. All of the controls and 10 of the vaccinated pigs sickened, presumably of hog cholera or complications. The deaths in the vaccinated groups occurred among pigs from 6 farms. The vaccinated pigs from the other 32 farms remained healthy.

f) Breeding stock which had received one 5-cc. injection of vaccine each year had proved highly resistant to hog-cholera virus exposure.

QUESTION—*Is it possible to spread hog-cholera infection, cause severe reactions, or expect uniform results from the administration of hog-cholera vaccines to pigs in poor condition?*

ANSWER—*a*) These vaccines are shown to be free of disease-producing virus by careful, laboratory-conducted tests under the supervision of a U. S. Bureau of Animal Industry inspector and they may be used without any danger of causing hog cholera.

b) Little or no systemic reaction is provoked by these vaccines. For this reason, unthrifty pigs may be safely vaccinated, but it should be kept in mind that unthrifty animals or those suffering from concurrent infections, malnutrition, and latent or inapparent infections, may not respond well to immunization against hog cholera, since it is a well-known fact that unthrifty animals are not good subjects for immunization against any infection.

c) I want to conclude by saying that when the problem of the eradication of hog cholera is fairly considered, it will be done and can be done by the systematic and intelligent use of these vaccines or in conjunction with other nondisease-producing methods.

Streptococcic Septicemia in Swine

JOHN B. BRYANT, D.V.M.
Mount Vernon, Iowa

QUESTION—*Will you briefly discuss some of the field aspects of streptococcic septicemia in swine?*

ANSWER—Several years ago, I met a condition in swine that was characterized by marked hemorrhages of the skin, tissues, and organs that varied from petechiae to ecchymoses. There was hematuria. The drove had been immunized against cholera two months previously. Except for 5 head set aside for an immunity test, the herd was revaccinated with serum and virus. All of the 5 resisted a 10-cc. injection of virus, indicating that the herd was immune to cholera and that cholera was not the cause of the trouble. There were but slight losses.

Later, I met the same condition in 10 sows and their 80 pigs, which were from 2 to 4 weeks old. The sows had been vaccinated against cholera as weanlings. R. M. Hofferd, of Cedar Rapids, Ia., visited this herd with me. Two sows were dead and 1 nearly so. About 30 of the pigs had died. Specimens from 3 sows and several pigs, examined at a laboratory, showed the presence of large numbers of streptococci. All of the specimens except one from a sow, gave bacterial growths. No more of the sows died; 35 of the pigs survived. This is, by far, the most severe outbreak of this condition I have seen.

During the last five years, I have had a number of cases of so-called streptococcic infection and many of my colleagues have reported losses from sporadic outbreaks, but at no time have I seen or heard of this disease assuming epizoötic or even enzoötic proportions.

History.—The onset is sudden and usu-

*From the Panel Discussion on Swine, eighty-first annual meeting, American Veterinary Medical Association, Chicago, Aug. 22-24, 1944.

ally death occurs in twelve to eighteen hours, more rarely in thirty-six to forty-eight hours. All ages are susceptible and it occurs under good as well as bad sanitary conditions.

Symptoms.—The predominating symptom is weakness and prostration. The temperature is elevated, and scours and bloody urine may be present, but the over-all picture is one of extensive cutaneous, tissular, and organic hemorrhages. The cutaneous lesions vary from petechiae to large blotches, varying in color from scarlet to blue and deep purple.

Autopsy Lesions.—The lymph nodes are congested, dark, and show peripheral hemorrhages. The epiglottis and tonsillar region are thickened, petechial and ecchymotic, and so are the lungs. The liver is pale, the bile granular, and the gall bladder and hepatic ducts may contain blood. The kidneys are dark, enlarged, and hemorrhagic and the hilus contains blood. The ureters and bladder are very dark, hemorrhagic, and thickened. I have never seen the bladder filled with urine. The thickened ureters prevent urine from flowing into it.

McNutt and Packer of Iowa State College describe a streptococcic meningoencephalitis in which the lesions are confined to the nervous system as well as a generalized streptococcicosis, or septicemia. The lesions were moderate pneumonia, serofibrinous pericarditis, pleurisy, and delicate strands of fibrin over the intestine and parietal peritoneum.

Hofferd describes cases in which the laboratory examination revealed large numbers of streptococci in the throat and adjacent structures. The lesions he described were greatly thickened and eroded tonsils, with gelatinous, blood-stained blebs on adjacent mucous membranes. The stained infiltrations extended into the peripharyngeal connective tissue and downward into the neck. He warned that the disease must be differentiated from anthrax.

Moehler, of Waterloo, Ia., observed an outbreak of the extreme, generalized, hemorrhagic type, in which there were hemorrhages everywhere and in which the various tissues revealed that the only significant organisms present were streptococci. In this herd of shotes, weighing from 100 to 175 lb., 16 out of 98 head died. The infection was contracted from wounds

(Continued on following page.)

With the Chinese Troops in the Salween Campaign



—U. S. Army Signal Corps Photo

In the foreground is Lt. Col. Edwin S. Wiseman (KSC '35), formerly of the faculty of the Division of Veterinary Medicine, Kansas State College, who has been on duty with the Army since October, 1940, and in the China-Burma-India theater for six months (as of Oct. 1944). He trains Chinese officers and soldiers in the care of animals and the American system of pack-animal transport, which is essential to successful military operations in mountainous terrain.

inflicted on the throat in the administration of worm capsules by a remedy agent.

Treatment.—Sulfanilamide supplemented with a bacterin containing streptococci was the treatment. This has been prescribed since sulfonamides came into use; prior thereto, the bacterin was the sheet anchor. The dose of sulfanilamide was 0.5 gr./lb. of body weight, twice a day in heavy slop. Animals too sick to eat are given the drug in tablets or capsules with a balling gun of proper size. I prefer both sulfanilamide and bacterin and, in addition, serum-virus vaccination of the herd if it has not been immunized against cholera. In that event, the bacterin is omitted and large doses of serum given. The sulfanilamide treatment is continued at least four to five days, or until all of the pigs are eating and are showing no evidence of impaired appetite. I have treated herds for two weeks without causing any ill effect from the drug.

Brood-Sow and Weanling-Pig Problems

J. L. JONES, D.V.M.
Blackburn, Missouri

QUESTION—*What are some of the clinical manifestations of vitamin A deficiency in sows?*

ANSWER—The clinical manifestations of vitamin deficiency in sows are impaired vision, nervousness, stiffness, posterior paralysis, irregular heat periods (usually of longer duration) and, frequently, sterility. The most common manifestation in our practice is abortion, or birth of dead or under-developed litters.

Q.—*What is the best approach to control and treatment of acute mastitis, so-called "milk fever", of brood sows?*

A.—Prevention consists of proper housing, sanitation, and, particularly, correct dietary. A light laxative diet before farrowing and nothing but water for twenty-four hours thereafter are advisable. In so-called milk fever, we recognize two entirely different conditions: one an acute mammitis, the other a condition in which there is a complete cessation of lactation without mastitis. In the latter condition, we get excellent results with 2 to 3 cc. of pituitary extract, injected intravenously or intramuscularly. Where mammitis exists, 3 to 6 mg. of lentin is of value as an evacuant. Cold packs are beneficial.

Frequently, acute attacks of swine erysipelas occur immediately after farrowing. Care should be taken not to confuse these acute attacks of swine erysipelas with so-called milk fever.

Q.—*In swine obstetrics, which is the more suitable, oxytocic lentin or posterior pituitary extract?*

A.—Both agents are of value. Over a long period of years, we have had fairly good results with intramuscular injections of posterior pituitary extract, in doses of 2 to 3 cc. Our experience with lentin has been limited, but we feel that it will prove to be valuable in these cases.

Q.—*What are some of the indications for the use of stilbestrol in sows and how efficient are the results?*

A.—It is used to stimulate and induce estrus, to eliminate retained placental membranes, and in pyometra to produce pus evacuation; in these cases we consider it quite efficient.

Q.—*What is the safest and most practical anesthesia for swine under field conditions?*

A.—Undoubtedly chloral-hydrate. It may be given intravenously, but we get satisfactory results by giving it *per orem*, dissolved in water, through a stomach tube.

Q.—*What are the causative factors of scours in suckling pigs, the prevention and treatment?*

A.—The causative agent in white scours is probably members of the coliform group developing under improper housing, insanitary conditions, and faulty nourishment, particularly vitamin A deficiency.

From the Panel Discussion on Swine, eighty-first annual meeting, American Veterinary Medical Association, Chicago, Aug. 22-24, 1944.

Deprivation of the colostral milk usually leads to severe, and often fatal, enteric disturbances. The best prevention is proper management and sanitation, plus a correct diet for the brood sow. In white scours, where it occurs as a litter or a herd disease, we have been successful in using methenamine in 30 to 60 gr. doses given in feed to the sow twice daily for two or three days.

Swine Erysipelas

J. E. PETERMAN, D.V.M.
Lincoln, Nebraska

QUESTION—*Of what economic importance to the swine industry is swine erysipelas? Also give comparative figures on the estimated financial loss.*

ANSWER—Tha data gathered on the incidence of swine erysipelas and its devastating effects to swine herds, though incomplete, are sufficient to warrant a conclusion that swine erysipelas is of great economic importance to the swine industry of the United States. However, such a statement does not forcibly impress or convince the average person unless some figures are given to substantiate it.

Swine erysipelas is known to exist in practically all important swine-producing states. It has been reported to be found in nearly every state. The only herd that does not suffer in some degree from erysipelas is the one in which it does not exist, but in many cases it is not recognized.

In estimating its economic importance, four chief factors should be considered, namely: (1) death losses on the farm, (2) retarded growth on the farm, (3) condemnations at slaughtering establishments; and (4) the wasted feed consumed by the affected animals.

Based upon our present knowledge of the annual incidence of erysipelas, it is estimated that in the United States 750,000 swine either die, are stunted or are condemned at slaughtering establishments. In addition, a conservative estimate of the feed consumed and wasted on these animals amounts to about 150,000 tons. Furthermore, basing our opinion upon the present prices of swine and feed, the estimated annual financial loss from erysipelas is approximately twelve million dollars, figures comparable only to those of hog cholera.

QUESTION—*Can erysipelas in swine be positively diagnosed on the basis of clinical symptoms? State briefly the best procedure in making a diagnosis of swine erysipelas.*

ANSWER—Yes, experience has shown that in many cases swine erysipelas can be positively diagnosed on clinical symptoms. The best procedure in making a diagnosis of erysipelas is to secure the information which is characteristic of erysipelas. This should include:

1) The complete and accurate history of the case.
2) An observation of the symptoms and antemortem lesions on all hogs.
3) Recording the temperature on a large per cent of the sick and the apparently well animals.

The characteristic histories of erysipelas in the acute form are:

1) Sudden death of either one animal three to ten days prior to, or of one or more animals at the onset of the herd attack.
2) Crisis reached quickly and of short duration.
3) Several animals sicken simultaneously.
4) Acute sickness about one week after being fed a carcass or offal.
5) Major death losses occurring during initial stage of the disease.
6) Recovery of sick animals without treatment within three to four days.

The characteristic symptoms of erysipelas in the acute form are:

1) Disinclined to move; show pain, soreness, stiffness, or trembling when aroused.
2) Equalizing body weight on all four feet.
3) Unexpected vitality when aroused.

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4) Temperatures in the herd vary from 104 F. to 108 F. or more.
5) Labored breathing; mucus in nostrils.
6) Whooping cough; vomiting.
7) Fair appetite in visibly sick hogs.
8) Eyes clear and alert.
9) Feces normal.

The characteristic antemortem lesions of erysipelas in the acute form are:

1) Firm, raised plaques on back and sides (diamond skin disease).
2) Scarlet, edamatous areas of skin on body, snout, ears, legs, axillary, or perineal region.

The characteristic symptoms of erysipelas in the chronic form are:

1) Retarded growth of apparently healthy pigs without visible lesions.
2) Development of the head, ears, and legs with cessation of body growth.

The characteristic lesions of erysipelas in the chronic form are:

1) Enlarged joints, with soreness and stiffness and thickened tendon sheaths.
2) Tail sloughing (after 5 to 6 weeks of age).
3) Tips of ears dry, harden, and later slough.
4) Lameness in heavy hogs.
5) Skin sloughing on back or shoulder, usually limited to one or two and not confined to white skin only.
6) Loss of hair, either a slight thinning or extensive, in irregular patches, or from diamond skin formations only.

If a majority of the preceding conditions are present, a diagnosis of erysipelas is warranted.

QUESTION—*How can it be determined if hog cholera and erysipelas coexist in the same herd?*

ANSWER—Quite frequently hog cholera and erysipelas coexist in the same herd and overlooking cholera has caused many a headache.

Erysipelas in the acute form and hog cholera are rarely observed in the herd at the same time. If both diseases exist, the erysipelas infection can be easily detected because it is usually the chronic form characterized by enlarged joints, etc.

In any acute sickness of swine where chronic erysipelas symptoms are present, it should be remembered that the chronicity is probably the result of a previous acute attack of swine erysipelas but the present acute illness probably is hog cholera. When either or both forms of swine erysipelas and hog cholera coexist, for the best results, treatment with hog-cholera serum and virus and antierysipelas serum given simultaneously is the best procedure in handling the case.

QUESTION—*Is the loss of tail, ear, or skin always evidence of swine erysipelas?*

ANSWER—No, not always. The loss of tails in pigs approximately 2 to 4 weeks of age, although a suspicious lesion of erysipelas, apparently is due to undetermined causes, since the injection of antierysipelas serum has failed to prevent such occurrences. However, tail sloughing, occurring in pigs after this age, is very typical of erysipelas infection.

The most typical ear lesion starts with drying of the tips which become hard and later slough. Either stage is a pathognomonic lesion. One or both ears may be affected. Occasionally, only a small portion on the edge of the ear sloughs. Other pathologic lesions such as edamatous ears, entire ears thick and leathery, curled ears, etc. may be caused by the disease but they are not typical lesions. Sloughing skin is not always evidence of erysipelas. When only the white parts of the skin are affected, the lesions are probably not due to erysipelas. Although it is possible that occasionally loss of skin involving both the white and dark parts is due to other causes, nevertheles this should be regarded as a lesion of erysipelas.

QUESTION—*Is it possible that the same animal may be naturally infected with the erysipelas organism and show clinical symptoms more than once?*

ANSWER—Basing the conclusion chiefly on clinical evidence, it seems possible that the same animal may be naturally infected with the same organism and show clinical manifestations of the disease more than once.

(*Panel discussion continued on following page.*)

Vitamin P is the factor of citrus fruit and certain vegetable juices which is said to reduce the tendency of capillaries to bleed. Vitamins C, K, and P have hemostatic action. The combination should be an effective treatment for purpura hemorrhagica of horses, inasmuch as that disease corresponds in some respects to vitamin P deficiency.

Respiratory Diseases in Swine

J. D. RAY, B.S., D.V.M.
Omaha, Nebraska

QUESTION—*What has been your experience during the past year as to the prevalence of respiratory diseases in swine?*

ANSWER—Respiratory diseases in swine have been more prevalent the past year than for several years.

Q.—*What explanation do you offer for the apparent increase?*

A.—Of first importance has been the increased swine population without a corresponding increase in facilities, on most farms, for caring for the extra pigs. Also, weather conditions have predisposed animals to this type of infection and the complicating microörganisms have gained in virulence, thereby producing a more severe problem than usual.

Q.—*What part do you think swine influenza virus has played in this problem?*

A.—Swine influenza virus has been an important primary factor in the respiratory complications as we have seen them. Influenza virus infection alone is not much of a problem but, when bacterial infections are associated with the virus, we have a different picture which varies, depending upon the organisms involved.

Q.—*When a hog has the "flu" it has the "flu." What do you mean by different picture?*

A.—True, but the "flu" Dr. John Koen originally described is one picture and the "flu" we find where Pasteurella organisms are the complicating bacterial infection is another, not to mention the simple picture produced by uncomplicated influenza virus infection.

Q.—*Can these pictures be differentiated?*

A.—Most of the time—by both symptoms and lesions.

Q.—*What are they?*

A.—Simple influenza virus infection in swine usually is not of much significance. If it produces evidence of disease at all, it will be a simple respiratory condition with a mild febrile reaction of short duration and no mortality. Autopsies of such animals will show only a slight involvement of the lungs.

Influenza, as originally described, is due to a combined infection of influenza virus and the swine influenza bacillus—*Hemophilus suis*. This symbiotic infection produces extreme prostration with high temperature, labored breathing, and paroxysms of coughing so frequently observed in swine. The course extends through several days and animals become emaciated rapidly. The morbidity is practically 100 per cent but the mortality is low, rarely exceeding 5 per cent if reasonable care is given the herd.

Autopsies show an acute edema of the lungs with adjacent lymphatic involvement. After thirty-six to forty-eight hours, the edematous fluids gravitate to the pendant parts of the lung. This causes the air cells in the involved area to collapse, resulting in a solidification of the parts. The area is a grayish color with little or no evidence of congestion or inflammation.

The type of influenza that has prevailed the past year in the Omaha territory, and apparently in most of the swine raising section of the country, has been a combination of swine influenza virus and Pasteurella infection. The initial onset of this combination resembles the typical influenza syndrome, except that death losses occur early in the outbreak and the mortality continues high. The course of the outbreak is prolonged.

Autopsies of pigs that die early with this combination show septicemic lesions with acute lung involvement. Hemorrhagic or congested areas prevail in the lungs. As the disease progresses, the edema gravitates; however, areas of hepatization due to the Pasteurella infection become established in various parts of the lung. Areas in different stages of hepatization give the lung a "marbled" appearance and the pleura over the hepatized spots is involved and frequently becomes adhered to the thoracic wall. Animals so affected require a definite time—at least seven or eight days—for the hepatized areas to pass through the differ-

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ent stages necessary before resolution or degeneration of the spot takes place. Obviously, a herd of this kind will show little or no response to treatment so long as the hepatization exists, while one with pulmonary edema only may respond favorably in two or three days.

Q.—*Frequently, an outbreak of influenza in swine will develop on a farm where the disease has not appeared for two or three years and other animals have not been added recently. How do you account for the sudden development of the disease in such cases?*

A.—That is a fantastic story and depends on the complicated life cycle of the swine lung worm. Dr. Richard E. Shope, of the Rockefeller Institute of Medical Research, worked out the details. If swine suffering from influenza harbor lung worms, the virus becomes established in the eggs produced by the lung worms during the course of the outbreak. The lung worm eggs are coughed up by the pig, swallowed, and pass out in the feces; earth worms working in the manure eat the lung worm eggs and they hatch in the gut of the earth worm. The lung worm larvae penetrate the gut wall and reside in the earth worm until it is eaten by a pig or otherwise accounted for. This may be two or three years later. When the earth worm is digested, the young lung worms are liberated, penetrate the bowel wall of the pig, and proceed to the lungs where they become established and grow to maturity.

The influenza virus present in the original egg remains viable through the larval stage and is replanted in the lung of the pig on completion of the cycle of the lung worm. This virus rarely produces immediate symptoms; instead, it remains dormant until some predisposing factor reduces the resistance of the pig sufficiently for it to become activated. When this happens, a new outbreak occurs with no apparent explanation unless you consider the lung worms as the source.

Q.—*You mentioned pulmonary edema in influenza cases. Is this lesion caused by other infections?*

A.—Yes, definitely. Streptococci, Corynebacteria, *Salmonella choleraesuis (suipestifer)*, and *Erysipelothrix rhusiopathiae* are the organisms causing the common diseases due to bacteria where this lesion is important.

Q.—*How can these organisms be identified as responsible for the lesion when observed at autopsy?*

A.—They cannot except by culturing the lesion. However, the other lesions may give a clue. The fact that more than one infection causes the lesion is the important thing to remember.

Diseases of Young Pigs

T. L. STEENERSON, D.V.M.
Wilkinson, Indiana

QUESTION—*What anthelmintic do you prefer for the removal of Ascaris in young swine? Give dosage, method of administration, and contraindications, if any.*

ANSWER—I prefer oil of chenopodium 22 mm. to one ounce each of castor oil and raw linseed oil. Each pig receives 2 oz. with a stomach tube. The stomach tube is made of a piece of 1/2 inch cloth-reinforced rubber tubing which is fitted to the long nozzle of the ordinary 2 oz. dose syringe. Contraindications are acute gastroenteritis.

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I do not feel that pigs should be "wormed" for at least two weeks following the simultaneous administration of serum and virus.

Q.—*At what age do you prefer to treat pigs with serum and virus, and what after care do you recommend?*

A.—Preferably, vaccinate pigs at 7 weeks of age so that they may remain with their mothers for at least two weeks following treatment. So far as after-care is concerned, a sudden change of diet at the time of vaccination is objectionable. House them in sanitary quarters and protect from extreme temperatures.

Q.—*What diseases in nonimmune pigs contraindicate the use of serum and virus?*

A.—Enteritis, swine pox, anemia, excessive ascariasis and acute pulmonary diseases are contraindications.

Q.—*What correlation exists, if any, between the proper feeding of the dam and pig and the occurrence of enteritis?*

A.—The occurrence of enteritis is in direct proportion to the improper feeding of the dam and pig, both before and after farrowing. Pigs receiving a balanced diet, containing ample amounts of vitamins A, B complex, and D, plus good husbandry, rarely develop serious enteritis.

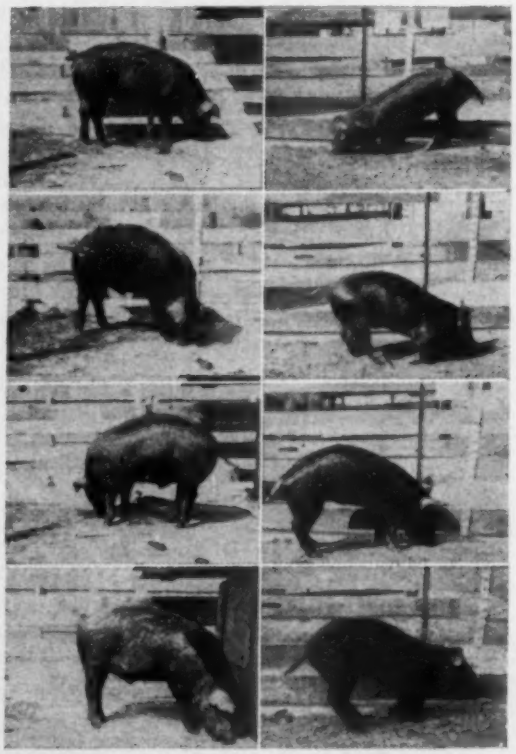
Q.—*What symptoms and/or pathologic lesions differentiate necrotic enteritis from swine or hemorrhagic dysentery?*

A.—Necrotic enteritis is a chronic disease, while swine dysentery is an acute disease. In necrotic enteritis, the appetite is rarely impaired; dehydration and emaciation are not rapid; bowel discharges are semisolid, varying in color and rarely containing blood. Temperatures rise slowly and usually not as high as in swine dysentery. Deaths are not as sudden and the disease usually occurs in pigs from 6 to 16 weeks of age. The lesions in necrotic enteritis are slow in forming, deep seated, and not as extensive as in swine dysentery. The walls of the intestine are thicker but retain more vitality than in dysentery; the contents are usually of semisolid consistency, casiated, and yellowish in color. Lesions of secondary infection are usually present. Swine dysentery is characterized by rapid emaciation and dehydration, the bowel discharges contain blood and mucus, and the spinchter ani is completely relaxed, permitting the discharge to ooze out, soiling the buttocks. Animals may die from acute toxemia, revealing minor clinical symptoms and no visible postmortem lesions. Temperatures range from 104 to 106 F., and animals of all ages are susceptible. The mortality in young pigs—pigs too young to eat and drink except the nourishment obtained from their mothers—is near 100 per cent. In older animals, the mortality need not be great if proper treatment is instituted promptly. The autopsy findings in acute swine dysentery are usually located in the large intestine and cecum, the contents of which are liquid, chocolate colored, and often filled with clotted blood. The bowel may be completely denuded of any mucosa, leaving a surface that has a velvet-like appearance.

Q.—*What are your objections to the intraperitoneal administration of anti-hog-cholera serum in pigs?*

A.—There is no objection to this procedure if it is properly done. The pig is held by the hind legs with its head between the knees. Insert the needle point (previously honed to round knife edge) under the skin in the left flank region in an upward direction. As the syringe is brought up to a horizontal position, the needle will enter the peritoneal cavity; start the serum flowing from the syringe with the same movement, and you will never experience any bad results from this method of administration.

Vitamin D Deficient Pigs



—Courtesy Nebraska Experiment Station

All these pigs received a basal ration consisting of yellow corn, soybean-oil meal, blood meal, dried skimmilk, and salt. Those on the right were kept in a hog barn and those on the left were kept in outdoor pens. Severe rickets developed in the pigs confined indoors, as these pictures show.—From Loeffel et al., Univ. Nebraska Res. Bul. No. 58.—(From Vitamin D Digest, Oct. 1944)

Swine Dysentery

L. P. DOYLE, B.S.A., M.S., Ph.D., D.V.M.

Lafayette, Indiana

SWINE DYSENTERY is an infectious disease affecting particularly the cecum and colon. It is readily transmitted through the bowel discharges of affected animals. Transmission in any other way appears doubtful at the present time. This disease has been recognized by practicing veterinarians and farmers in some localities; and by a few investigators for a number of years. However, it was not until recently that the disease received rather general recognition by the veterinary profession. The disease was first described and its present name proposed by workers at the Indiana Agricultural Experiment Station in 1921.[1] Dysentery in swine evidently existed in some parts of the country for many years before it received any official recognition.

The recognition of swine dysentery as a disease entity was an important step toward the proper understanding of the so-called enteritis complex. Until this complex is separated into its component parts, we shall not have an adequate or satisfactory understanding of what are probably the most important disease conditions in swine. It is doubtful if any other diseases of swine approach, in economic importance, those which affect the intestinal tract.

At the present time, swine dysentery is known to be rather widely distributed in the swine-producing sections of the United States. It has also been reported from at least one foreign country. There is no clear history of its distribution or migration in the past. In Indiana, it was first recognized in feeder hogs which were brought in from certain of the northwestern states. It appears that the disease has been recognized for many years by some practicing veterinarians in areas which no doubt have been infected for a long time.

It can be definitely stated that swine dysentery is caused by some infectious factor or factors present in the cecum, colon, and the bowel discharge of affected hogs. The disease can be readily reproduced, as a rule, by feeding the cecum, colon, or the bowel discharge from infected animals to pigs. From the results of several feeding experiments, it appears likely that the causative agent is limited largely, if not entirely, to the cecum and colon, so far as the visceral organs are concerned.

Various bacteria and several protozoa have been found in the intestinal tract and other tissues of hogs affected with dysentery. Among the bacteria found, paratyphoid or Salmonella microörganisms have been given the most attention. Of the protozoa balantidia and spirochetes are rather commonly found in the intestinal content and, to some extent, in the intestinal wall of hogs affected with dysenteric as well as nondysenteric colitis. There is not clear-cut proof that Salmonella organisms play a primary part in causing swine dysentery. On the contrary, there is considerable negative evidence indicating that these microörganisms play a secondary rôle, if any, in the disease.

Microscopic examination of scrapings from the cecal or colic mucosa, as well as the bloody mucus in the bowel discharge, usually shows the presence of large numbers of vibrios. These microörganisms can sometimes also be found fairly deep in the mucosa of the cecum and colon in properly prepared sections. An apparently pure culture of vibrio has been isolated[2] from the colon wall of dysentery hogs. The technical difficulties encountered in isolating and propagating this microörganism make it difficult to determine its full causal relationship to the disease. It is interesting to note that in some of the vibrionic diseases of the intestine, e.g., Asiatic cholera, the causative vibrio is limited largely to the intestine.

The incubation period in swine dysentery is usually from seven to ten or twelve days in experimentally produced cases. In field cases, as much as thirty days or more may pass between the time of exposure and the

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[1]Purdue University Agric. Exper. Sta. Bull. No. 257, Oct. 1921.

[2]Doyle, L. P.: Vibrio Associated with Swine Dysentery. Am. J. Vet Res. 5, (Jan., 1944): 3.

first symptoms. The most prominent symptoms have suggested the common names which have been applied to the disease such as bloody diarrhea, bloody scours, bloody flux, and black scours. As suggested by these names, a conspicuous symptom is diarrhea with more or less blood in the bowel discharge. At first, there may not be anything characteristic about the diarrhea. Usually, however, there are considerable amounts of mucus and more or less blood in the stools within a day or two of the onset of diarrhea. In young animals, the blood in the stools is usually easily recognized. In older animals, the blood may be changed so as to give the stools a dark color, hence the name "black scours". In the early stages, the diarrhea is often quite profuse in hogs that are on full feed. The presence of blood, mixed rather intimately with the stool content, sometimes gives the bowel discharge the appearance of tomato catsup. The presence of mucus together with the blood is an important aid in definitely recognizing swine dysentery. In later stages, the diarrheal discharges may contain bits of exudate and desquamated epithelium, giving it a rice-water appearance. At this stage, mucus and blood are usually still present in the bowel discharge.

Affected animals often show an apparent rapid loss of weight, probably due mainly to rapid dehydration. The flanks or sides sink rapidly; and there is sometimes active switching of the tail, probably due to irritation of the rectum and anus. There is usually some weakness, but often affected animals appear fairly bright and do not show much depression. The appetite often remains fairly good, hence, a partly filled stomach is frequently found on postmortem examination. Elevation of body temperature is a variable symptom and in many cases, is not found. In late stages, relaxation of the sphincter ani may make accurate determination of body temperature difficult.

Death may occur within a short time after the first symptoms are observed or it may be delayed for several days. Unless the herd is kept under fairly close observation some animals may die before symptoms are noted. Recurrences of diarrhea are common in animals that have apparently recovered temporarily. Continued unthriftiness or stunting of animals that live adds to the economic importance of swine dysentery. The death loss in affected herds may vary from a few animals to more than 50 per cent. The average death loss is about 25 per cent. The death rate is usually higher in younger than in older animals. In suckling pigs, 80 to 90 per cent may die. The disease has been known to persist for many years on farms where effective control measures were not applied. The sypmtom of "black scours", particularly in mature swine that do not die, should always be carefully considered, because the starting of dysentery in a herd may be marked by black diarrhea in older animals.

The essential lesions of dysentery are found in the cecum and colon. From the pathological standpoint, the disease is a cecitis and colitis. Gastritis is also fairly commonly found. The small intestine does not show recognizable gross lesions in uncomplicated dysentery. There is a remarkably sharp line of division between the normal and pathologic tissue at the ileocecal valve. In severe cases, the entire cecum and colon may be so deeply congested that they have a reddish colon which can be readily seen when the abdominal cavity is opened.

The changes found in the mucosa of the cecum and colon depend upon the severity and the stage of inflammation. In an early stage of severe inflammation, the mucosa is markedly reddened and its surface is usually covered with bloody mucus. There may also be considerable quantities of blood and mucus in the lumen of the cecum and colon. In later stages, there may be varying amounts of diphtheritic exudate on the surface of the mucosa. This exudate, together with desquamated epithelium, may become loosened and mixed with the cecum and colon content causing a rice-water effect. Even in later stages, there is usually present considerable blood and mucus. While, as already mentioned, the cecal and colic mucosa may show superficial diphtheritic changes, there is usually absent the deeper necrosis and infarction such as occurs in hog cholera. Not infrequently, the rectum shows changes similar to what have been described in the cecum and colon.

The differential diagnosis of swine dysentry may present some difficulty, particularly in atypical cases. Clinically, it probably resembles coccidiosis more closely than any other disease. Coccidiosis seems to be rare in hogs in the Cornbelt. A microscopic examination of selected portions of

the bowel discharge usually makes the differential diagnosis easy. Certain cases of hog cholera and other conditions which cause a severe cecitis and colitis may, clinically, closely resemble dysentery. An examination of the entire affected herd and the careful evaluation of other symptoms usually make a differential diagnosis possible. Swine dysentery is occasionally mistaken for poisoning by corrosive substances. A careful study of history and the lesions found on postmortem examination usually makes it possible to avoid such an error.

Treatments which have been used thus far consist mainly of administering solutions of alkaline material and solution of sodium chloride, one theory being that the alkaline substance causes a beneficial change in the hydrogen ion concentration of the intestinal tract; and that the sodium chloride helps to reduce dehydration and maintains a favorable chloride ion concentration of the body fluids. Some practitioners mix the alkaline and sodium chloride solutions with the feed while others prefer to administer the solutions by drenching, or by use of a stomach tube. The stomach tube, when properly used, is considerably neater and safer than drenching.

One of the oldest salt treatments consists of dissolving 10 lb. of salt in 50 gal. of water and then soaking oats in the solution. Other feed is withheld to insure consumption of the salt-treated oats. It is not considered advisable to continue the treatment without interruption for longer than four or five days. After a rest period of four or five days, it may be repeated. An intestinal antiseptic is usually used in connection with this treatment. Dr. T. L. Steenerson, of Indiana, uses a treatment in which he gives, by means of the stomach tube, one-half ounce each of sodium chloride and bicarbonate of soda in one pint of water per 100 lb. of body weight. It is highly important that hogs have easy access to plenty of water while on salt treatment.

Some practitioners depend mainly or altogether on special feeding methods in treating swine dysentery. Usually, the method is temporarily to reduce greatly, or eliminate entirely, the use of ordinary feed, and to supply instead a bland nutritious feed such as milk and molasses. Thus far, the sulfa drugs appear to be less effective in dysentery than in some other forms of enteritis in swine.

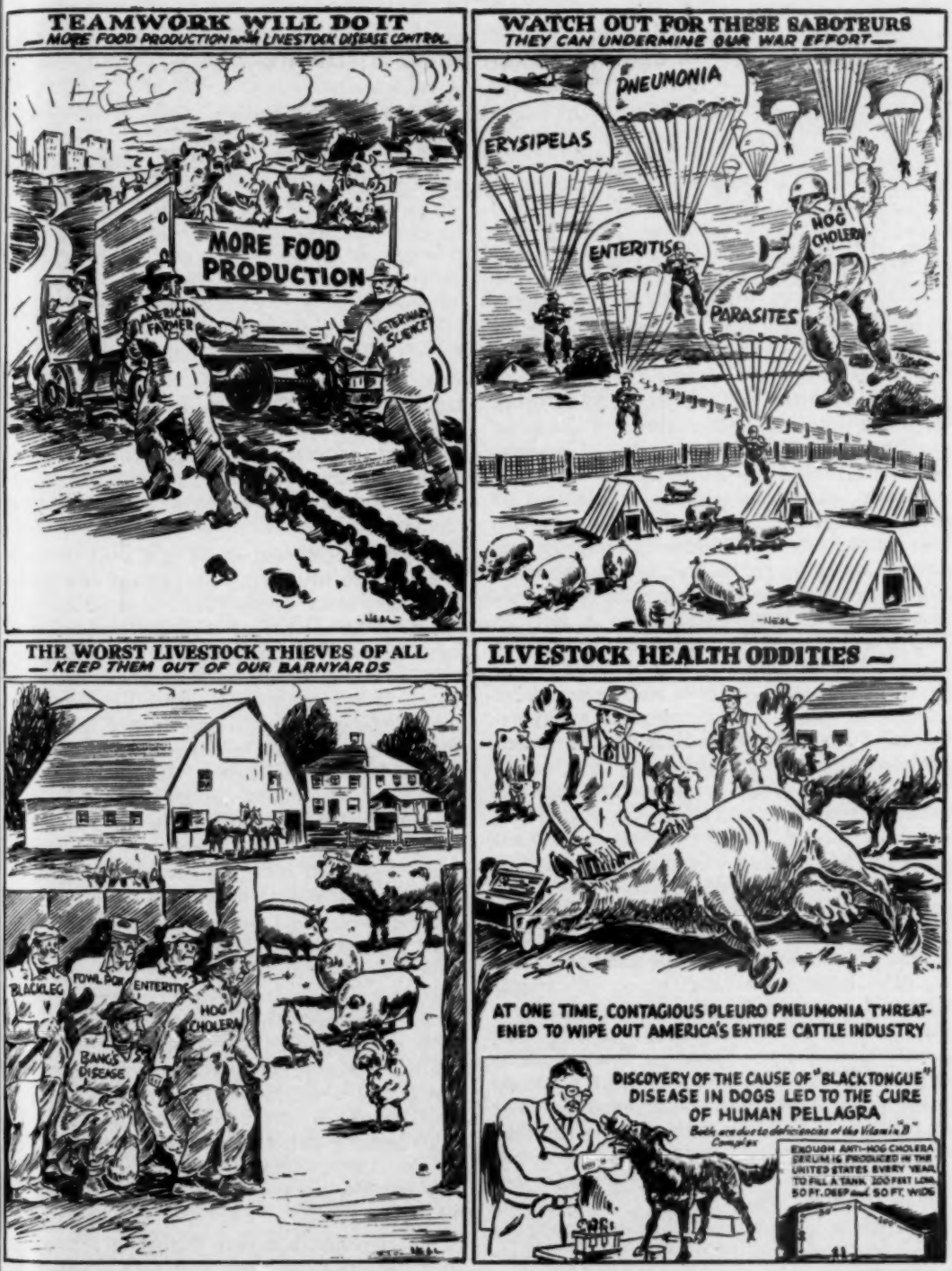
While the management and treatment of dysenteric herds are important, the development of control measures to prevent the spread and perpetuation of the disease is even more significant. An effort should be made to teach the farmer not to be satisfied with a diagnosis of scours or intestinal "necro" in hogs, but to seek further help in determining the exact nature of the disease present. Costly results may follow a failure to recognize the beginning of dysentery in a large herd. Numerous cases have been observed where dysentery remained for years on farms. This is particularly true where the same yards are used year after year with no interval or only a short one between successive batches of hogs. The disease sometimes persists on infected farms where breeding stock is kept over from one season to the next, even though new yards or pastures are used. This latter observation suggests that some animals, which have gone through an outbreak, may act as carriers of infection although they appear healthy. Hence, it may be advisable to dispose of all hogs, including the breeding stock, in order to rid a farm of dysentery infection. In many cases, the most satisfactory and effective way to handle dysentery is to sell all of the hogs for slaughter and then start over with clean yards or pastures with animals from a healthy source.

Turkey Crop

The 1944 turkey crop as given in *American Egg and Poultry Review* from figures tabulated in August by the U. S. Bureau of Agricultural Economics was 35,666,000 birds, an increase of 8 per cent over 1943, and an all-time high record. Broken down by states the tabulation shows:

Calif.	4,260,000	Nebr.	1,163,000
Texas	3,650,000	Ohio	919,000
Minn.	3,251,000	N. Dak.	917,000
Iowa	3,334,000	Okla.	906,000
Ore.	2,084,000	Ill.	853,000
Mo.	1,532,000	Ind.	657,000
Utah	1,475,000	Wis.	654,000
Wash.	1,411,000	S. Dak.	568,000
Penna.	1,285,000	N. Y.	428,000

Obedient to the custom that every soldier in the service of the United States eat a turkey dinner on Thanksgiving Day, the Army had taken 100,000,000 lb. of this crop by August 26.



—American Foundation for Animal Health

Four out of many pictorial suggestions to the American farmer on the importance of veterinary science, sponsored by the American Foundation of Animal Health in its educational campaign in the agricultural press.

Vesicular Exanthema in Swine

J. TRAUM, D.V.M., M.S., *Berkeley, California*

and

H. W. SCHOENING, V.M.D., *Washington, D. C.*

At the eightieth annual meeting in St. Louis in 1943, a film on "Vesicular Exanthema in Swine," produced by the California State Department of Agriculture, was shown, on special request, by Dr. Traum. The following discussions of the disease and its marked similarity to foot-and-mouth disease and vesicular stomatitis were then presented by Drs. Traum and Schoening.—Editors.

DR. J. TRAUM: For the past eleven years we have had in California a disease in garbage-fed swine which is indistinguishable from foot-and-mouth disease or from vesicular stomatitis. It is indistinguishable to those of us in California who are well acquainted with foot-and-mouth disease in swine by contact with it in the field, and by experimental work with foot-and-mouth disease and vesicular stomatitis. The disease is also indistinguishable by men of the Bureau of Animal Industry in Washington, D. C., who have had extensive experience both in natural and in experimental foot-and-mouth disease and in experimental vesicular stomatitis of swine.

Not only is this vesicular exanthema indistinguishable by us in this country, but it is indistinguishable by some of the leading students of foot-and-mouth disease in Europe. We have sent the virus to Washington and from there it was sent to Europe and, I think, also to Australia. Later, Waldmann, who is probably the world's leading authority on foot-and-mouth disease, said in a communication to Doctor J. R. Mohler: "The picture of such a generalized hog disease after infection with the virus in question—that is, vesicular exanthema virus — corresponds fully to that in hoof-and-mouth disease, so that even we who work daily with hoof-and-mouth disease could not distinguish between the two."

So, when I say that vesicular exanthema and foot-and-mouth disease are indistinguishable in the field, I mean just that. However, we have found very definite differences, experimentally, between vesicular exanthema and the other two virus diseases (foot-and-mouth disease and vesicular stomatitis).

During the eleven years that we have had this disease in California, it has been present every year except 1937 and 1938. At least it was not reported in those years. In some years, it was severe and infected large numbers of hogs on many ranches; in other years, it was mild and seen only here and there. Two years ago and during the present year, premises housing 25 per cent of all the hogs in California were found to be infected. That does not mean that 25 per cent of the hogs in California were affected but that the premises upon which this disease was found housed at least 25 per cent of the hog population in California.

As far as we know, the disease is confined almost entirely to garbage-fed hogs. Last year we did find it on eight or ten grain-feeding ranches, but, in practically every instance, there was direct contact with garbage-feeding ranches. For example, one man owned a garbage-feeding ranch and a grain-feeding ranch; another man bought a purebred boar for his garbage-feeding ranch, then later, returned it to the grain-feeding ranch. Some such direct contact was established in practically all of the cases.

We also had a severe outbreak following the exhibition of hogs at a fair. The fact that this disease is found on garbage-feeding ranches and not on grain-feeding ranches, does not mean that grain-fed hogs are not susceptible. They are susceptible. In all of our experimental work we use grain-fed hogs so as to be reasonably sure

From the Division of Veterinary Science, University of California (Traum), and the Pathological Division, U. S. Bureau of Animal Industry (Schoening).

See announcement under "U. S. Government" in "The News" section of this issue of new BAI film on "Vesicular Diseases of Animals" now ready for loan to professional groups.

that they are not immune. Grain-fed hogs do not have the disease because they are not exposed to the virus as are garbage-fed hogs.

As far as I know, vesicular exanthema has not been found in the United States, except in California. Since no reports have come from other states, I am reasonably sure that it has not existed outside of California.

I have never seen any reports which would permit me to state definitely that the disease exists in foreign countries, but I would not be surprised to learn that it is there. In some places where foot-and-mouth disease is endemic, this condition would naturally be called foot-and-mouth disease.

You might ask, "Why has this disease not been found elsewhere in this country? Why has it not been found outside of California?" I do not know, but I think the principal reason is that California does not export hogs or pork. We import large quantities of both hogs and pork — more than we produce, I think, but, as far as I know, there is little movement of hogs eastward. There probably has been some movement of hogs and pork out of the state, but we cannot assume that every hog or piece of pork that left California contained vesicular exanthema virus. Even so, it may not have reached hogs elsewhere to infect them. In other words, with the set-up that we have in California the chances are slim of vesicular exanthema being introduced east of our state.

The situation now, however, is a little different. Before the war, there were only a few packing houses in California under federal inspection, but now, in order to facilitate the movement of pork and meat products, and to enable the Army and Navy and other government agencies to purchase meat (they cannot purchase meat unless it has been federally inspected), the federal meat inspection service has been extended to many of our slaughtering and packing plants. As a result, the interstate barrier has been practically removed. Shipments have gone east—how far east, I do not know—and, certainly, the potential danger has increased tremendously.

You must ever be on the alert and, when foot-and-mouth disease-like lesions are found, suspect that disease until it is definitely proved otherwise. However, do not get frantic about it—do not think that everything you see looks like foot-and-mouth disease. If you suspect it—not if you are in doubt, but if you just suspect it—report it to the proper livestock sanitary authorities and they will take care of the rest. Bear in mind that we have definitely proved—as far as proof can be ascertained—that vesicular exanthema, is *not* foot-and-mouth disease.

Hogs are the only animals that can be regularly and definitely infected, experimentally. Horses take the disease in a mild way by scarification or intradermal inoculation on the tongue. We have never been able to infect cattle, although we have inoculated several hundred head by scarification of the tongue and dental pad. European investigators have likewise tried to infect cattle, but without success. We are unfortunate in that, in the laboratory, we do not have a suitabe experimental animal like the guinea pig, as we do in studies on both foot-and-mouth disease and vesicular stomatitis. A small animal, susceptible to the virus of vesicular exanthema, would make it possible to do a tremendous amount of experimental work. A partial answer has been found in the hamster. But its usefulness is limited; it does not exhibit lesions regularly nor have any secondary lesions been observed in hamsters. In our cross-immunity tests, the production of secondary lesions is an important factor.

Thus far, we have been able to demonstrate at least three immunologically different types of this disease. I think Dr. Crawford of the Animal Disease Station at Beltsville has also shown three or four types. In conclusion, I will read the following general summary:

From our work, it is evident that we are dealing with a disease in swine which, from lesions and symptoms and even from its course, cannot be safely differentiated from foot-and-mouth disease without the aid of animal tests.

Although differences have been found and pointed out, we must consider that the viruses of foot-and-mouth disease and vesicular stomatitis and vesicular exanthema of swine are closely related. In fact, the first two, vesicular stomatitis and foot-and-mouth disease, have been demonstrated by various tests to be so much alike that, aside from their immunological differences and the differences in particular size, only the

constant pathogenicity of vesicular stomatitis virus for the horse and its slower degree of pathogenicity for cattle and guinea pigs differentiate it from foot-and-mouth disease virus.

Thus far, vesicular exanthema virus has been found to differ immunologically from foot-and-mouth disease and to be not altogether in accord, immunologically, with the vesicular stomatitis virus. It also differs from both by its failure to induce lesions in guinea pigs and in cattle, and it further differs from foot-and-mouth disease virus by its infectivity for the horse, although this infectivity is slight.

All three viruses — foot-and-mouth disease, vesicular stomatitis, and vesicular exanthema — s e e m *experimentally* to be equally pathogenic for swine.

For almost twenty-five years we have been differentiating b e t w e e n foot-and-mouth disease and vesicular stomatitis, and in the case of the latter—vesicular stomatitis—we have not invoked a drastic slaughter method or severe quarantines but have simply prevented the movement of infected livestock from individual premises for approximately thirty days, and have had no serious spread of the disease. We have no reason to change our methods of control of vesicular stomatitis, and are trying to apply them to vesicular exanthema of swine.

One final thought: Thus far, we have found greater differences between vesicular exanthema of swine and foot-and-mouth disease than we have between vesicular stomatitis and foot-and-mouth disease.

DR. H. W. SCHOENING: It seems like old times to be on a program with Doctor Traum and talk about foot-and-mouth disease, vesicular stomatitis, and vesicular exanthema. As many of you know, we were both on the commission which was sent to Europe in 1925 by the United States Department of Agriculture to study foot-and-mouth disease. We had the opportunity at that time to make detailed comparisons between foot-and-mouth disease and vesicular stomatitis. But we did not then know of the disease under discussion this afternoon, vesicular exanthema, which clouds the picture and makes us scratch our heads a bit. It certainly is similar in many respects to foot-and-mouth disease, and it is impossible of definite differentiation except by animal inoculation measures.

In 1932, when this disease first appeared in California, it was diagnosed as foot-and-mouth disease, and, for that reason, rigid measures were taken by the U. S. Bureau of Animal Industry and the state of California to suppress it. The regular stamping-out program was undertaken. All of the infected and exposed animals were destroyed by slaughter, the premises were thoroughly cleaned and disinfected, and the usual period of quarantine and restocking was undertaken, as is done with foot-and-mouth disease. We thought the disease was eradicated.

The following year—1933—it appeared again, and the slaughter method was again employed to eradicate the disease despite the fact that it only appeared in swine and that other experimental animals failed to develop symptoms on inoculation, raising the question as to whether or not it was really foot-and-mouth disease.

In spite of this, the stamping-out method was employed, but the disease appeared again in the following year, 1934. By this time, evidence at hand indicated that the outbreaks were not foot-and-mouth disease, and further attempts to eradicate it by the stamping-out method were abandoned. The name, vesicular exanthema, was given to this disease by Traum in 1934. It appears probable that vesicular exanthema is much more difficult to eradicate than foot-and-mouth disease. It has been possible to eradicate the latter completely by the stamping-out method. Foot-and-mouth disease manifest itself very promptly as an acute infection that can be quickly and definitely recognized. With vesicular exanthema, it is possible for it to smolder for extended periods in some animals in a very low-grade form, not clinically recognizable, and later flare up in the acute, recognizable form when conditions are suitable.

All of this is of extreme interest and importance, particularly at the present time. As I pointed out in my paper this morning, it behooves everyone to be on guard and on the lookout for foot-and-mouth disease because our program of eradication is based on early diagnosis, which is the most important step. If we can get on top of the disease, we can eradicate it quickly. When it smolders and the animals have had a chance to move around, the big outbreaks occur, and many difficulties are encountered.

Dr. Traum has pointed out that the movement of swine and swine products out of California makes it possible that vesicular exanthema might appear in some other parts of the country. In the Middlewest, within the last two or three weeks [summer of 1943], we had occasion to examine animals at a hog-cholera serum plant that showed a vesicular disease. We thought at first it was vesicular exanthema. Bovine animals in contact with the swine failed to show the disease.

Arrangements were immediately made to inoculate animals for differential diagnosis, and two horses, two cattle, five hogs, two goats, and several guinea pigs were inoculated. Within forty-eight hours very definite lesions were present in the horses, cattle, swine, and guinea pigs, which put the virus definitely in the class of vesicular stomatitis.

We were much surprised at this result because vesicular stomatitis has not been seen naturally as a swine disease, up to the present time. We have seen vesicular stomatitis in horses and cattle many times on farms where there were swine, but it has never been recorded as a swine disease.

Just how the infection propagated itself, we are not sure. Vesicular stomatitis can be produced experimentally in swine. We can see it in its various forms by experimental inoculation, but it has not been seen heretofore, naturally.

All of these things should be thought about by the veterinary profession and we should be on our guard to make quick and accurate diagnoses.

Campus of Washington State College, Pullman

Buildings and grounds of the College of Veterinary Medicine are just below the upper right inset.



Upper left, President E. O. Holland; upper right, administration building housing library, museum, reading room, and scientific laboratories; lower left, class rooms, clinic rooms, surgeries, small animal hospital; lower right, Dean E. E. Wegner, College of Veterinary Medicine. (Large animal hospital orientated at the left of the lower inset is not shown.)

More Profitable Hog Production

WILL J. MILLER
Topeka, Kansas

MORE PROFITABLE hog production is a broad subject and the time allotted to me will not permit of detailed discussion.

For today and tomorrow we, who depend upon hogs to produce a part of our total farm income, are primarily concerned in keeping pork production profitable in the postwar period. We know that the number of hogs on farms is relatively small, compared to present-day demands. We know that Congress has guaranteed hog prices at parity for approximately two years after hostilities cease, and we know they will be fairly satisfactory.

Knowing these facts, it is our responsibility to do the best job we can, to follow best-known practices of breeding, feeding, and sanitation in producing and feeding hogs for early marketing—in other words, producing finish and weights acceptable to packers and consumers in the shortest possible time and with the least possible feed costs. You are handicapped in any race without a good start. Thus, selection of seed stock, good breeding and feeding, and attention to sanitation in and about the hog barn and pens are very important.

Good management always pays big dividends. Success or failure in hog production is more or less determined by the follow-through of good management. This means doing a few simple things at the right time. Certainly, good management means proper feed for the sow during the gestation period and immediately before farrowing. Twenty per cent or more of the sow's ration might be ground alfalfa—when this is provided, husky pigs are farrowed and given a good start in life.

Nothing pays better dividends than the time spent with the sow at farrowing time. She should have clean and sanitary quarters. A brooder for the pigs is essential—an electric brooder if possible, but if this is not available a covered jug filled with hot water and placed in a basket in the brooder will serve to warm and dry the little pigs until they are strong enough to be up and about. Start now to plan your brooder house—a home-made house is satisfactory if properly constructed. I know of one large Kansas operator who has averaged saving 8 pigs per litter since using a good brooder—before using the brooder of 5-pig litter was common. This successful breeder uses a light bulb or a water jug placed in an empty wooden barrel as a brooder.

Saving feed is especially important during the war, since all feeds are essential in the production of food supplies. Tests show that good clean pasture for hogs and pigs saves grain and proteins. There are several good varieties of pasture for hogs. Corn is all important but is often scarce in the southwest areas. However, kafir, milo and grain sorghums are surer crops for us and offer good results, as does wheat and barley, when fed with care.

Let's look at the boar—good breeding history is tops, and a high production record most valuable. A fast-gaining boar will sire fast-gaining pigs. A slow-gaining boar will sire poor-feeding and slow-gaining pigs. Boars from large litters tend to sire large litters—and this fact applies, in some degree, to sows. Let me emphasize that a good production record back of your boar is as important as one back of your dairy-type bull. Certainly, none of us would consider buying a dairy-type bull without studying his bloodlines and the production records of his sire and dam. When you buy a boar be sure to get one with a good production record behind him—be sure he comes from a family of high producers with good type and conformation—the kind that will feed easy, flesh smoothly, and turn feed into pork rapidly. This will cut feeding costs to the minimum. In addition, I would recommend that all breeding stock be negative to a brucellosis test.

Before the present war, Denmark virtually had control of the world's pork market with their supertype hogs. Pork production was one of that country's principal industries. I am told that before a

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Mr. Miller is livestock sanitary commissioner of Kansas and executive secretary and treasurer of the Kansas Livestock Association.

Presented before the First Oklahoma Livestock Conservation and Production Clinic, Oklahoma City, Oct. 20-21, 1944.

boar could be offered for sale he had to be, first of all, out of a sow with a production record behind her and he himself from a large litter—also that a barrow from this same litter was required to be butchered and the cuts of meat declared superior. All these conditions had to be fully met before the boar could be sold or used for breeding purposes. Denmark's record of profitable pork production was made by adhering to these strict requirements. Let us take a lesson from our Danish friends and make our pork production more profitable.

Profitable pork production in the years immediately ahead will depend upon good breeding, good feeding, and good sanitary practices, with a lot of good common sense and management, such as the elimination of runts; vaccination of pigs at the proper age; using heavy dosage of serum and virus to insure long time immunity; castration of pigs at from 10 to 20 days old—but do not castrate, ring, and vaccinate at the same time; handle flu pigs carefully—good nursing, segregation, plenty of good fresh water, proper housing, and sunshine bring best results. The same may be said with reference to enteritis, plus medical care. When sickness appears consult a veterinarian promptly.

Lung worms, which often cause heavy losses to hog producers, can be avoided by (1) clean the farrowing house with hot lye water, (2) wash the sow's udder with a mild antiseptic before placing her in the farrowing quarters, and (3) haul, don't drive, the sow and pigs to clean, fresh pasture. All are simple rules, but if followed will save pigs and much feed. Pigs free from worms get a good start and reach marketing condition early.

Now, just a moment to discuss the type of postwar hogs. The Wartime Swine Industry Council recommends the "middle-of-the-road" type of hog, which, when ready for market, yields a high percentage of the most valuable cuts of meat and a minimum of lard—a hog which can be finished at from 200 to 240 lb., or which may be carried on to heavier weights, when condition of the markets justify, still without excess lard. Bear in mind that excess lard production will be the number one problem of the industry, and edible oils our greatest competitor.

In the past, feeding operation tests show that the short, chubby, compact type are not profitable to raise, nor are they the type the packer wants. Carcass cut out tests and production tests and records show a hog with a broad head, a full loin, a fairly long side, and with depth and a plump, well-shaped ham, as the profitable type for the producer and packer. Figures indicate that hogs weighing from 180 to 220 lb. have the most meat in relation to the amount of lard. College tests also show that the 180 to 220 lb. range is the point where gains seem most profitable.

Last but not least, let us not overlook the possibilities of the Landrace type of hog from Denmark. Much research is now being conducted by the United States Bureau of Animal Industry at Beltsville, Md., at the agricultural experiment stations in Minnesota, Iowa, and other states. At Minnesota, the Landrace is being crossed with the Tamworth breed. The offspring is practically jowlless, long bodied, straight bellied, with good loins and well-shaped hams, and truly a bacon not a lard type, ready for marketing at 160 to 200 lb. Having personally visited two of the experimental farms recently, I was much impressed with the type resulting from this cross.

Please understand these remarks are along generally accepted lines. Each producer has his own problems—your problem is perhaps particularly your own. You know the feed supplies you have, the kind of feed available, and it is up to you to balance your hogs with feed supplies. No one knows your problems as well as you, but in a program of expansion or looking to more profitable hog production, these statements of fact will be valuable to everyone. I believe the farmers in this section of the country can compete with Cornbelt feeders, if they produce and market their feed crops through livestock. Pork production can be made a profitable part of farming to the extent that the best practices of management, breeding, feeding, and sanitation are followed—and to this extent will he profit most.

The correspondent who writes, "I graduated at a veterinary college and practiced some twenty-awed years," may be telling the truth.

BE HUMANE BUT NOT SOFT

You are buying War Bonds to fight a crafty enemy who comes to you either on his knees or with a club.

The Commercial Improvement of Swine Through Breeding

OLIVER S. WILLHAM, B.S., M.S., Ph.D.
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BREEDING might well be defined as man's systematic attempt to change animals so that they will more nearly serve his own needs. His ambition is to make each succeeding generation better than the preceding one. His results will, therefore, have to be measured by comparing a present generation with a preceding one. The average interval between generations of swine is about two and one-half years, which makes breeding a relatively slow process and one with which a person must work for many years to attain success. Most all the worth while improvements in livestock breeding have been made by men who have bred livestock for a long time. Mr. Peter Mouw, who was instrumental in developing the large-type Poland China hog, was in the business for more than a quarter of a century. The same was true of Mr. Nick Gentry, who helped develop the Berkshire breed in America. The Tompkins family in England bred the same herd of Herefords for seventy-five years. The late Mr. Hazlett, whose Herefords have attracted so much attention during the last quarter of a century, was in breeding business for nearly forty years. It has been extremely fortunate for the Hereford breed that a large part of the tops of the Hazlett herd were secured and help intact by the Turner ranch. The great herd which was started by Mr. Hazlett is now being successfully carried on by Mr. Roy J. Turner at his ranch near Sulphur, (Oklahoma). These examples emphasize the importance of time in animal breeding. Any breeder who hopes to make a contribution to a breed must start early, and continue to work late, in life. He has no time to lose.

Swine breeding, being a long time job, requires record keeping because it is impossible to remember all the essential things in connection with even a moderate sized swineherd. Young pigs should be marked at farrowing so that they can be identified, and a record made of the number farrowed. There are many marking schemes used which are successful and will identify the pig as long as it remains in the herd. When the litter is weaned, the weight and number of pigs should be recorded. Individual weights for each pig would be worth while, but if it takes too much time, the weight of the entire litter will be sufficient. This will enable the breeder to judge the producing ability of the sows. When the pigs reach market weight, a record should again be made of the number in the litter and their weight. A few notes made concerning a litter during the growing season may be helpful at culling time.

Selection is the principal tool of the animal breeder. In order to select successfully, the breeder must first decide upon an ideal as far as type and performance is concerned, and second, he must find breeding animals that approach his ideal as closely as possible in both type and production. From a genetic point of view, an offspring is a sample half of the inheritance of its sire and a sample half of the inheritance of its dam. A sire or dam can, therefore, be best evaluated by an examination of a number of its offspring. This is particularly true where the animals are all in the breeder's herd. In examining the offspring of an animal, be sure that all are examined (both good and poor). In selecting gilts and young boars, it will be necessary to inspect their parents, their litter mates, and their half brothers and sisters.

Numbers are important in selection. The larger the number of animals raised, the more chances you have for selection. This makes it necessary to raise a large percentage of the pigs farrowed. The herd must, therefore, be kept free from disease and parasites. It is generally much easier to obtain the proper kind of pig from a litter of 10 than it is from a litter of 5. Good sows and boars should be carefully preserved so they can produce many offspring.

It has been found by scientific investigations that from 10 per cent to 40 per

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cent of the variations ordinarily found in livestock are hereditary in nature and can be transmitted to the offspring. This means that from 60 per cent to 90 per cent of the ordinary variations occurring in livestock are due to environmental causes and will not be transmitted to the offspring. The breeder who is familiar with the environment in which the pig has been raised will be in a position to take part of this into account.

When a breeder employs selection only in his herd, he finds that the further he goes the harder his job becomes. In nature, there is a great tendency for animals to throw back to the mean of the population or race. The further selection pulls the herd average from the population mean, the stronger is this pull back toward this mean. Inbreeding, or better yet, linebreeding is used to overcome this pull toward the mean by fixing a few of the characters. Linebreeding is inbreeding directed toward increasing the relationship of a herd to one certain animal. Inbreeding will fix certain characters in each generation and if it is accompanied by severe selection, good characters will be fixed. Mr. Gentry successfully demonstrated this system of breeding in the early history of the Berkshires in this country. The speed or intensity of the linebreeding that can be used depends on just how successful you are at being able to discard all the undesirable characters that are fixed. This varies greatly in different herds. The question is often asked, "Should I inbreed or linebreed my herd?" A safe answer to this question is linebreed when you are producing better sires in your own herd than you are able to obtain outside. If you are fortunate enough to have an exceptionally good animal in your herd, then linebreed to this good animal in order to increase the relationship of your herd to it. Inbreeding divides a population of livestock into distinct families. Selection can then be made to a certain extent by families and some of the deceiving effects of environmental variations can be avoided.

The breeder who practices linebreeding should always be on the alert for a good outcross, because he may need one any time. The outcross has to be made when an undersirable character becomes fixed in a linebred herd. The good breeder should try to keep up with the boars and gilts he sells for breeding purposes; in this way he will be able to tell with which lines of breeding his animals nick best. It is also a good idea for a breeder to test out a few outcrosses in his own herd so that he will not have to mark time until one is found. Outbred pigs usually have more vigor and make better market hogs than the linebred hogs. Some breeders do not like to make an outcross and avoid it too long. In this way they retard improvement in their herd.

Some hog men may prefer to raise hogs for the market and not sell any of them for breeding purposes. In this case, they might be interested in crossbreeding. Systematic crossbreeding is all right but promiscuous crossbreeding can ruin the swine business. In order to produce good crossbreds, you must use good purebreds of two different breeds. It has been demonstrated that crossbred sows can be used successfully if they are mated to a purebred boar of a third breed. Here again they must have come from good, purebred foundation stock. The crossbred litters are generally a little larger than purebred litters and they have just enough more vigor to put them over small obstacles that sometimes cause trouble with purebreds. If conditions are optimum at all times, it is doubtful whether the crossbred will produce any better results than the purebred but if the season is adverse, the crossbred may have a considerable advantage. The hybrid vigor obtained in crossbreeding is one of the best proofs that there is actually some real genetic difference between pure breeds.

At the present time, the Regional Swine Breeding Laboratory at Ames, Iowa, is attempting to develop inbred lines within a pure breed, so that these lines can be crossed and hybrid vigor be obtained within the pure breed. The Oklahoma Experiment Station is collaborating in this work and is developing four inbred lines of Durocs. This work has not progressed far enough to draw any definite conclusions, but the results to date are encouraging. The litters produced by crossing two inbred lines averaged 1 pig more at birth and 1.7 pigs more at 180 days. The linecross pigs were no larger at birth or weaning, but were 59 lb. heavier than the pureline pigs at 180 days. The linecross pigs gained between 1/6 and 1/4 lb. per head per day

faster than ordinary outbred pigs. The linecross litters were 1.3 pigs smaller than crossbred litters at 180 days but they gained enough faster that they averaged 39 lb. heavier at 180 days. This made the linecross litters 34 lb. heavier than the crossbred litters at 180 days.

In order to improve swine, the breeder must select good type pigs which have been produced by dams that have consistently weaned a maximum amount of pork at 8 weeks, and from litters that have also produced a maximum of pork at 6 months of age. The pigs should also be sired by a boar that has a good production record. Do not make the common error of castrating a good boar just following the breeding season and then find out that his pigs are extremely good. A boar that sires good pigs can be used for several years if he is managed properly and not allowed to become too fat. Another error that is commonly made in swine breeding is to dilute out the influence of a good sow or boar in the herd by continual outcrossing. If you have an exceptionally good breeding animal, practice some line breeding and keep the influence of that individual in your herd as long as possible. Too many people, who happen to get a good sire, mate the daughters of this sire to a nonrelated boar and then in the next generation they mate the granddaughter of the good boar to still another nonrelated boar. They had 50 per cent of the blood of the good boar in his daughters, 25 per cent in his granddaughters, and only 12 1/2 per cent in the offspring of the granddaughters.

The proper type of breeding hog should have a clean-cut head, short neck, neat jowl, smooth shoulders, low, full flanks, long, deep, smooth sides, full loin, long, full rump, sound feet and legs, and a full, deep ham. The teats on a sow should be examined closely to see that there are at least six good ones one each side and no inverted ones. The rudimentary teats on the boar should be examined to see that none are inverted. The defect is mentioned because it causes much trouble in breeding herds.

Science is beginning to admit that the origin of man is less important than his finish.

Reducing Losses in Swine by Controlling Diseases and Parasites

In the ten minutes allotted to me to discuss the possible losses in swine from diseases and parasites, I can only touch the high spots in these ever-present and devastating conditions affecting swine.

There are many diseases that could and should be considered as very important as they affect this more-than-ten-million-dollar industry in Oklahoma. Perhaps the ever-prevalent, disastrous disease of hog cholera still offers the industry its most troublesome and expensive problem. It is recognized and dealt with by all men in the business of producing hogs. Today, after years of experimental work and bitter experience, the disease is preventable and controllable.

There is another baffling disease known as swine erysipelas, a young disease as far as really diagnosing it is concerned, yet known for many years in the old country. As we now know the specific cause of the disease and are able to diagnose it, surely new methods of determining how it is spread and experimentation on ways of immunization will lead to its final solution.

A forerunner, or a predisposing factor to all these and many other disturbances is parasites, external and internal. Like a "fifth column", parasites seldom give warning of their presence but attack from within, taking the strength of the host that nourishes and protects them. They are most effective in young animals and often what is recognized as only a few will cause an unthriftiness and render young animals susceptible to infectious diseases.

There are two methods of controlling parasites, one is to administer drugs, and the other is to outgeneral the invader and raise pigs under conditions so nearly perfect the pigs will not become infested.—*C. H. McElroy, Stillwater, Okla.*

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A B-29 Superfortress costs $600,000 in War Bonds—Help finance a few; it's 2,000 miles from Leyte to Tokyo.

Hog Rations with Emphasis on Proteins

J. C. HILLIER, M.S.
Stillwater, Oklahoma

THE FACT that animals must receive a minimum amount of protein in their rations was recognized by early investigators in animal nutrition. Our farm grains when fed alone do not furnish enough or the right kind of protein for hogs. No single point in livestock feeding has been more clearly demonstrated, by controlled feeding trials or by practical feeding experiments, than the fact that corn alone gives poor results when fed to young pigs or to bred sows. Early experiments demonstrated clearly that our farm grains were deficient in both quantity and quality of protein and in mineral matter. More recent investigation indicates that some of these farm grains are also deficient in vitamin A, which is essential for growth and reproduction in swine.

The value of making up these deficiencies (or balancing the ration as it is commonly called) by including feeds that are high in protein or mineral matter or vitamins has been demonstrated many times. For instance, in the feeding of a balanced ration of corn and tankage, as compared to feeding corn alone, it has been found that 100 lb. of tankage would save from 500 to 600 lb. of corn. We have also learned that protein from one source may be more valuable than protein from another source in correcting the deficiencies of corn or other grains. For instance, corn-gluten meal will not produce nearly as good results as meat scraps, tankage, or skimmilk, when fed in a balanced ration with corn or any of the farm grains. This is because the protein in these grains and the corn gluten contain too small an amount of one or more of the essential amino acids. Such feeds are said to have protein of poor quality. On the other hand, the meat scraps, tankage, or skimmilk supply the amino acids in more nearly the correct proportion for complete utilization and are said to have protein of higher quality. In general, proteins of animal origin such as fish meal, meat scraps, tankage, and skimmilk are of higher quality than those from a plant source such as cottonseed meal, soybean meal, and corn-gluten meal, etc. It is, therefore, quite important that young pigs

TABLE I—The Protein Supplement Requirement of Hogs in Drylot

	Protein needed in ration (%)	Supplement to use	Pounds of Supplement per 100 lb. of Mix[1]			
			with corn	with ground wheat	with ground barley	with ground kafir
Pigs up to 50 lb.	20	A	28	23	25	26
Pigs 50 to 80 lb.	18	A	24	15	18	20
Pigs 80 to 120 lb.	16	A	19	9	12	14
Pigs 120 to 165 lb.	14	B	13	4	6	8
Pigs 165 to 220 lb.	12	B	7	3*	3*	5
Bred sows[2]	14	B	13	4	6	8
Nursing sows	15	B	16	7	9	12
Breeding gilts and boars	15	B	16	7	9	12

[1]Five per cent alfalfa meal should be included in all rations fed to growing and fattening pigs in drylot.
[2]In feeding sows, ground alfalfa hay can be used to advantage up to 15 per cent of the ration if the alfalfa is high quality, fine-stemmed, and leafy.
*The percentage of protein supplement in these rations was not reduced below 3 per cent in order to keep up the quality of the protein in the ration.

Supplement A (46% crude protein)	
Meat scraps (50% protein)	50 lb.
Soybean meal (41% protein)	25 lb.
Cottonseed meal (43% protein)	25 lb.
	100 lb.

Supplement B (44% crude protein)	
Meat scraps (50% protein)	34 lb.
Soybean meal (41% protein)	33 lb.
Cottonseed meal (43% protein)	33 lb.
	100 lb.

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(from weaning to 100 lb. in weight) receive some animal protein in their ration. Pigs of this age are much more sensitive to quality of protein than are older hogs or other farm livestock.

It has also been demonstrated that young growing pigs need a higher proportion of protein than do older hogs. Therefore, one should not attempt to feed the same ration to hogs of all sizes and ages but should vary the ration according to the weight and age of hogs being fed. We believe that the following percentages of crude protein in the ration for pigs on good pasture will give the most satisfactory results: For pigs weighing 50 to 80 lb. 16 per cent; 80 to 120 lb. 14 per cent; 120 to 165 lb. 12 per cent; 165 lb. to market, 10 per cent. Where hogs are fed in drylot, it is necessary to supply about 2 per cent more protein in the ration and the quality of protein becomes a more important item.

The lack of vitamin A in the grains is taken care of by furnishing a good green pasture, by including dehydrated alfalfa leaf meal, and by including vitamin A preparations or preparations of carotene in the ration.

The tables herein can be used as a guide for computing rations for pigs of various weights.

To use table 1 (for hogs in drylot), look up the pounds and kind of supplement for the kind of grain being used and the weight of the pigs. To this amount of supplement, add 5 lb. of alfalfa meal, and the remainder of the 100 lb. of ration will be the available grain.

Table 2 (for hogs on pasture) is used in the same way except that the alfalfa meal can be omitted.

In case it is impossible to secure meat scraps, skimmilk, or any other source of animal protein, a mixture of equal parts of soybean meal and cottonseed meal could be used, or soybean meal, alone. The omission of all of the animal protein will reduce the gain slightly and increase the feed required per pound of gain.

Protein rich feeds are generally more expensive than grains and are also the part of the ration that must be purchased, therefore, every feeder is interested in conserving his high protein feed and making it go as far as possible. With this in mind, the following recommendations are made.

TABLE 2—The Protein Supplement Requirement for Hogs on Pasture

	Protein needed in ration (%)	Supplement to use	Pound of Supplement per 100 lb. of mix			
			with corn	with ground corn	with ground barley	with ground kafir
Pigs up to 50 lb.	18	A	24	18	19	20
Pigs 50 to 80 lb.	16	A	18	11	12	14
Pigs 80 to 120 lb.	14	B	13	5	7	9
Pigs 120 to 165 lb.	12	B	8	3*	3*	4
Pigs 165 to 220 lb.	10	B	3*	3*	3*	3*
Bred Sows[1]	12	B	8	3*	3*	4
Nursing sows	13	B	11	3*	4	5
Breeding gilts and boars	13	B	11	3*	4	5

[1]In feeding sows, ground alfalfa hay can be used to advantage up to 15 per cent of the ration if the alfalfa is high quality, fine-stemmed, and leafy.
*The percentage of protein supplement in these rations was not reduced below 3 per cent in order to keep up the quality of the protein in the ration.

1) Use green, growing pasture. The use of good green pasture will eliminate the need for alfalfa hay or meal in the ration, and will reduce by about 25 per cent the grain required to produce a unit of gain. Furthermore, the protein content of the grain ration can be about 2 per cent lower. (These factors account for the differences between table 1 and table 2.)

2) Use skimmilk, buttermilk whey, etc. One gallon of skimmilk or buttermilk per day balances the ration of pigs fed corn.

3) Use ground alfalfa hay. For drylot feeding, properly cured, fine-stemmed, leafy alfalfa hay may be ground and fed in amounts up to 15 per cent of the ration for pigs weighing over 150 lb. At least 5 per cent should be included in the ration for smaller pigs. Average alfalfa hay is of little value in a swine ration. Only No. 1 extra green, extra leafy hay should be considered.

4) Change the protein content of the ration according to the weight of the pigs. Feed a ration high in protein when the pig is small and reduce it as the pig becomes older. The proportion of animal protein can also be reduced as the pigs become older.

SURGERY & OBSTETRICS

AND PROBLEMS OF BREEDING

Intestinal Obstruction from Foreign Body (String)

Among the reported cases of intestinal foreign bodies of animals or human beings, no case of string as a fatal foreign body is found in the literature. This report is to describe the death of a Great Dane from a piece of string swallowed accidentally.

The dog, a 2-year-old Great Dane bitch, previously in good health, started suddenly to refuse food for no apparent reason. The next day she began to vomit and had numerous small loose bowel movements. The vomiting continued, the vomitus becoming darker and somewhat fecal in odor. The initial diarrhea was succeeded by constipation. She became rapidly weaker, failed to respond to enemas or injected fluids, and died on the fourth day of her illness in a restless toxic state.

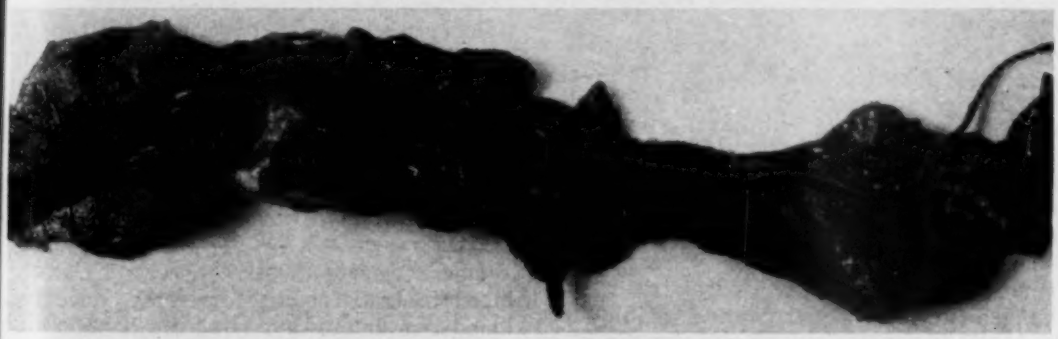


Fig. 1—Photograph of small intestine showing the string lying in a groove it made by pressure on the wall of the intestine.

An autopsy was done. The thoracic cavity, heart, lungs, and esophagus were normal. The peritoneal cavity contained thick pus with a fecal odor. Adjacent loops of intestine were gummed together by the fibrinopurulent exudate coating their serosal surfaces. The liver, spleen, pancreas, adrenals, kidneys, ureters, bladder, and reproductive organs were normal. On opening the gut, a piece of string about 2 feet long and 1 mm. thick was found lying lengthwise in the midportion of the small intestine. This string was fully extended, with no coiling, with its long axis parallel to that of the intestine. It had worn a groove in the intestinal wall. This groove penetrated the mucosal layer and much of the muscularis. In some areas, it had penetrated the entire muscular layer, and in two places it had penetrated the serosal layer also, permitting passage of intestinal contents into the peritoneal cavity. This doubtless was the source of the peritonitis that led to the dog's death. The rest of the gastrointestinal tract was normal except for the peritoneal exudate on its serosal surface.

The string in this case was of a type often used to tie feed sacks, and it was thought that this might have been the source of the string found in the intestine, ingestion having occurred in eating spilled feed. Had it rolled up, the string might have passed through uneventfully. In its stretched-out state, peristalsis had been unable to pass it along, and the pressure of the taut string on the intestinal wall resulted in the pressure necrosis and even-

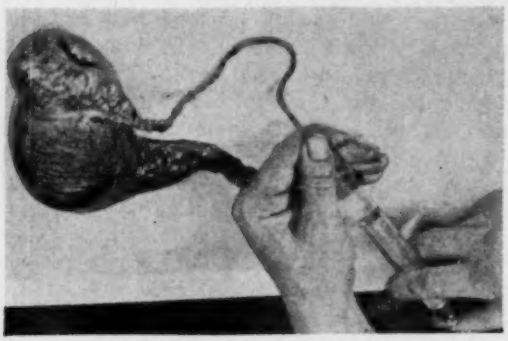
From the Department of Pathology, Johns Hopkins University, Baltimore, Md.

tual perforation with resulting peritonitis.

Summary.—A case of fatal intestinal obstruction in a dog, due to a piece of string accidentally swallowed is described with postmortem findings.—*George G. Merrill, M.D., Baltimore, Maryland.*

Studies of Boar Semen

The spermatozoa taken from different parts of the epididymus and vas deferens lived longer *in vitro* under the shock of cold than spermatozoa of the semen ejaculated by the same boar, according to experimental work conducted by Lasley and



—*From Journal of Animal Science*

Fig. 1—Showing the procedure of collecting semen samples from the epididymus by injecting buffer into the vas deferens.

Bogart, University of Missouri. The resistance of spermatozoa to cold varied according to the part of the tract whence the sample was obtained. The longevity seemed to be governed by changes within the sperm cells themselves rather than from differences in the fluid in which they were suspended, there being no difference in survival time between spermatozoa suspended in semen plasma and epididymal fluids. Lower survival of ejaculated semen appeared to be due to intracellular changes. The location of a droplet of protoplasm seen at different places along the length of the sperm-cell tail was pointed out as probably significant since it (the location) differed according to the part of the reproductive tract from which it was taken (head or tail of the epididymus, vas deferens), and seemed to be related to the survival time. The protoplasmic droplet was absent in the spermatozoa of ejaculated semen. [*John F. Lasley and Ralph Bogart: A Comparative Study of Epididymal and Ejaculated Spermatozoa of the Boar. J. Anim. Sci., 3, (Nov. 1944): 360-370.*]

Multiple Births

The unusual number of multiple births within the last year (twins, triplets, quadruplets, and quints) is arousing attention in the world of science. One theory is that Nature is compensating for lives lost in war; another attributes the phenomenon to reverting evolution *i.e.*, back to the litter in lieu of just one, and still another explains that the advance of artificial, postnatal incubation is accountable, for, the nonviable offspring don't make the headlines. Then we read of the nutritional theory, one gynecologist contending that malnutrition makes for polyfecundation, while another takes the opposite view that the balancing of nutrition, which is one of the obsessions of World War II, is entitled to share the responsibility (or credit) for multiple offspring. Sheepmen call it "flushing," and that is fact, not theory, in animal production.

Normally, twins are born once in every 87 times, triplets once in 7,569, quadruplets once in 658,503, and quintuplets around once in 57,000,000 times. No evidence at hand changes these ratios. It seems that the best explanation is that medical science has increased the chances of newborn "multiples" to live, yet there is Dr. Dafoe's butcher's basket and warm blankets for an incubator, and a teakettle of hot water to clean things up. It seems that while more of these supernumerary handouts survive the ordeal of coming into the world, more of them also are brought to public attention in this now small world.

Dogs tolerate massive doses of citrated blood in transfusions for shock caused by blood loss amounting to as much as 60 per cent of the total volume, provided the transfusion is given promptly. The tolerance is even higher when the bleeding and the transfusion are simultaneous.—*Annals of Surgery.*

Aspirin has an anticoagulant action that disqualifies it as a postoperative analgesic. When so employed, vitamin K should be given also.—*Science Digest.*

If he pulls the tooth, the whole tooth and nothing but the tooth, he's a good dentist.

Surgical Notes by Haasjes

Prepartum milking prevents the teats of pendulous udders from being exposed to the dirt and injury that cause mastitis.

• • •

In collecting milk from an udder for microscopic examination, keep the tube slanted to prevent falling particles from contaminating the samples.—*Drs. Merchant and Packer.*

• • •

Cow pox appears to be a forerunner of acute mastitis. Four cows out of 7 affected with cow pox, in the same herd, developed acute mastitis a week later, although they were negative for mastitis when first examined.

• • •

In the handling of mastitis, infusion treatment is but an adjunct to sanitation of which good bedding and keeping the tails out of the unbedded gutter are paramount. Tamp the bedding with a fork and train the cows to step onto it. Bed the gutter. Use straw for sanitation rather than for manure.

• • •

That "the teat meatus is the mightiest *os* of animal production" (*J.A.V.M.A.*, Sept., 1944, p. 149) is a truism, but, obviously, few practitioners know the dimensions and location of its guardian sphincter so thoroughly portrayed by Foust (*Ibid.* Feb. 1941, p. 147). Its fibers run not only around the end of the teat but also wind obliquely around the streak canal about one-half to one inch upward.

• • •

In stenosis of the teat, the most important operation is amputation with a sharp scissors one-eighth to one-quarter inch above the meatus, performing the job in strictly aseptic fashion. Rapid healing is essential. If the teat leaks, insert a milk tube with a movable shoulder slipped over it and with the flange on the outside. Two pieces of band-aid, cross fashion, are applied with a small bit of gauze impregnated with mercurochrome. The leakage will stop in a day or so.

• • •

In amputating the end of the teat, drawing upon it with the tumor forceps will leave a conical wound that will heal more slowly than a wound facing only the end of the teat. Experienced clients prefer amputation to the use of teat dilators which cause infection. As teat injury is a prolific cause of mastitis, the surgeon's wound is not an exception, if not surgically clean in the making and aftercare.

Posterior Paralysis in Lactating Sows

When lactating sows "go down in the back", the phenomenon is the best known demonstration of the persistence of lactation to maintain a uniform chemical composition of milk, for, in default of sufficient intake of the elements required, the body reserves are drawn upon, come what may. The skeleton yields its mineral elements that milk may be what it is as an essential nutrient for the young, the adolescent, the mature. The paralyzed brood sow is also a clinical demonstration of robbing the mother to nourish her unborn young. In these simple functions lies the importance of mineral intake in animal production. Highly productive farm animals are either milking or carrying young, or both, much of their lives. Calcium and phosphorus, and vitamin D to lay them down, are watched in feeding animals.



—*From Fleischman's, 1944*

Typical Scene of the Hoglot

New Concept of Surgery

A new concept of Army surgery—aimed at full restoration of health rather than mere saving of life—is revolutionizing the management of wounds in France and Italy, according to a report prepared by Colonel Edward D. Churchill, MC, surgical consultant in the Mediterranean Theater of Operations. The new techniques, grouped under the term "reparative surgery," are designed to prevent infection before it is established

or cut it short at the period of its inception. Colonel Churchill emphasized a new "golden period"—the time between initial surgery and reparative surgery. The report summarized the developments as follows:

In this war there have been two quite different approaches to the application of chemotherapeutic agents to military surgery. The first would utilize these agents to permit delay in wound surgery and minimize the incision of tissue destroyed by the missile. The second employs chemotherapy to extend the scope of surgery and achieve a perfection in results previously considered impossible.

The latter policy has guided the surgery of the Mediterranean theater. To reiterate the axiom that penicillin is not a substitute for surgery is not enough. Every surgeon must learn that chemotherapy opens new and startling possibilities in wound management.

To realize fully the potentialities of reparative surgery requires the introduction of a new concept in the organization of military surgery. Four to ten days is the "golden period" during which time wounds must be closed, fractures reduced, retained missiles removed and other procedures to prevent or abort infection must be carried out.

Failure to take cognizance of the potentialities of early reparative surgery at the base in future plans and operations will be as glaring an omission as a failure to plan for the removal of the wounded from the field of battle.—*From the Technical Information Division, Surgeon General's Office.*

Man-Made Anaplasmosis

Careless practices in the disinfection of instruments used in dehorning, castration, and vaccinating cattle are pointed out as spreaders of anaplasmosis. The specific protozoan parasite remains in the erythrocytes of cattle that have recovered from attacks of the disease. Thus, cattle showing no signs of illness remain sources of the infection. In an investigation by George W. Stiles of the U. S. Bureau of Animal Industry, 355 cattle out of 3,000 developed anaplasmosis traceable to unclean instruments. In another study of 3,200 cattle, 700 were infected and 200 died. The infectiousness of anaplasmosis from surgery was shown in a study of 61 head of cattle that had their horns merely tipped at a stockyards en route. A month later, 9 of these were sick and 3 of them died. Blood examinations revealed the presence of the Anaplasma.

Stiles stresses the importance of sterilizing clippers, saws, hypodermic needles, scalpels, and other instruments before performing any kind of surgical operation.

Human Bite Deadly

Excepting the bite of a rabid dog, the human bite is the deadliest and, particularly if treatment is delayed, amputation is often the sequel. Says Dr. Otho C. Hudson of Massachusetts General Hospital: "The human mouth contains deadly bacteria. Impress laymen and doctors with the necessity of quick treatment. Whether the skin is broken or not, cut out all injured tissue and splint the injured region." Out of 14 cases of hand bite, 5 out of 7 treated late lost fingers from amputations, and 1 out of 3 late comers lost the hand.—*Excerpt from Time, Oct. 16, 1944.*

To this, the experienced veterinarian would add that the bite of a horse is seldom a trivial injury. The injury suffered from inter-equine combats is generally a serious contusion, and slow healing. Veterinarians attribute the seriousness and slow healing of horse bites to the two-way contusion—pinching—not to bacterial virulence.

In reviewing trends in veterinary education before the Illinois University of Veterinary Conference, President James Farquharson of the AVMA emphasized that "The average graduate shows sublime inability to reason and to use his hands in the performance of professional tasks." The remedy proposed is to have students actually practice during the last part of their training.

The waxed paper removed from cigarette cartons is used as a surgical dressing in the Army. It is washed with soap and water, laid out in sheets and sterilized in the autoclave. Holes are punched in the sheets to allow drainage and to permit irrigation. The material has the advantage of being nonadherent and of being abundant.

CLINICAL DATA

Clinical Notes

Britton, University of California, found phenothiazine toxic for pigs affected with necrotic enteritis.

Ammonium chloride, a common ingredient of so-called cough remedies, is physiologically incompatible with sulfonamides, says *Medical Times*. Reason not given.

Aniacinosis is a newly coined name for nicotinic acid (= niacin) deficiency. The new word is a signal for the coinage of others for designating entities of the vitamin-deficiency category.

Insufficient vitamin A in fall and winter feed accounts for a large proportion of losses among young animals due to the low milk flow of sows, ewes, and cows, and also causes deaths among breeding stock and low egg production.—*North Dakota Agricultural Experiment Station Bull. 6, 1944.*

Allantomide ointment is the name given to a mixture of allantoin and sulfanilamide in a fatty base, to which extraordinary healing properties are attributed, particularly as an application for bedsores.—*Med. Rec. through J. Am. Pharm. A.*

Among the many wounded sailors and marines there has not been a single case of tetanus, according to a report of the Navy Bureau of Medicine and Surgery as of Sept. 15, 1944, and the Surgeon General of the Army reports that no case of tetanus has occurred among completely vaccinated troops. A few cases occurred prior to vaccination or before the vaccination process had been completed.

A confirmed case of acetonemia in a sow is reported in *Cornell Veterinarian* by Sampson, Hanawalt and Graham, of the University of Illinois.

Pentobarbital sodium for small pigs and chloral-magnesium mixture for mature hogs are anesthetics of choice in swine surgery.—*A. G. Danks in Cornell Veterinarian.*

Stilbestrol was shown to possess important microbicide potency against *Mycobacterium tuberculosis, in vitro,* in researches conducted by Faulkner of the University of Bristol (England).—*Am. Rev. Tuberc. 50, (Aug. 1944):167-175.*

As a rule in animal medicine, the cough is more beneficial than harmful, being an explosive effort to expel deleterious mucus from the air passages. Generally speaking, the term "cough remedy" in veterinary practice is a misnomer. The formula is aimed at the cause not the explosion.

Figures on Spanish pottery found in Peru suggest the existence of ulcerative leishmaniasis among the inhabitants of the powerful Inca Empire — the disease now known to be caused by the protozoan parasite *Leishmania tropica,* Wright.—*From the Scientific Monthly.*

Kronberg, Daft, and Sebrell *(Pub. Health Rept.,* June 20, 1944) produced vitamin K deficiency in rats by feeding various sulfonamides in stated amounts. Severe degrees of hypoprothrombinemia occurred in two to three weeks by feeding sulfapyradine, sulfadiazine, and sulfathiazole at a 1 per cent level in purified diets.

Traum's Disease

Traum's disease, or swine brucellosis, occurs in many localities in Illinois. Though abortions may occur, many affected sows give birth to normal litters. The breeding record is, therefore, not an index of the presence or absence of swine brucellosis. . . . . Aborts and discharges contaminate the premises. Infected boars may transmit the disease. . . . . The infection may be brought into healthy herds by newly purchased sows, gilts, or boars. . . . There is no medicinal remedy, or preventive vaccine. Prevention depends upon herd management, among which are clean ground, clean housing, disinfection, together with elimination of infected animals. The agglutination test, monthly or semimonthly, is a reliable means of diagnosing swine brucellosis. . . . . Reactors may be sold for immediate slaughter or sold as reactors for introduction into already infected herds, or kept isolated under a veterinarian's supervision. . . . . Reacting boars should not be used. . . . . Aborting sows are not returned to the herd until negative to the blood test. . . . . Disinfect with lye solution, 1 lb. to 20 gal. of boiling water, or cresol compound or its germicide equivalent. . . . . Test annually and keep newly purchased stock isolated for two months until proved negative. . . . . Accreditation certificates are provided by the State Department of Agriculture on the basis of two semiannual negative tests. . . . . Accredited herds must show two annual negative tests or three consecutive negative tests at six-month intervals to maintain accredited status. — *From Department of Animal Pathology and Hygiene, University of Illinois, Dec. 1, 1944.*

Cheese-Borne Diseases

Among the cheese-borne infections under discussion in public health literature are typhoid fever, brucellosis, staphylococcic food poisoning, and septic sore throat. Several outbreaks of typhoid fever have been traced to cheese factories. Huddleson, after visits to Mexico, confirmed the prevailing belief that much of the undulant fever in that country was caused by eating cheese made from raw goat's milk. California has passed a law requiring that cheese factories must pasteurize or permit cheese to ripen a certain time before putting it on the market. In 1936, Hucker and Marquardt read a paper before the New York State Dairy and Milk Inspectors mentioning milk-borne septic sore throat. Workers of the Food and Drug Administration traced an outbreak of undulant fever in southern Colorado to organisms they isolated in goat-milk cheese. In New Zealand, pasteurizing milk in making cheddar cheese has been practiced for many years. The pathogenic flora of cheese is being studied in Wisconsin, New York, and Canada. Pasteurization, or curing for no less than sixty days, embodied in the California law, is indicative of the proposed preventives.

Blood Plasma Carotene and Vitamin A in Colostrum

Significant conclusions in clinical veterinary medicine may be derived from the critical studies that have been made of colostrum in regard to its function of supplying carotene and vitamin A to the plasma of calves. The plasma of the bovine fetus and newborn calf is known to be remarkably low in these essential factors until the intake of colostrum supplies them. The flare to normal is striking during the first 24 hours of calfhood. The average gain in round numbers is from 3 μg/100 cc. at birth to 15 μg/100 cc. at the age of 1 day (Moore and Berry, 1944).[1] The gain is due to the intake of colostrum, which is from 10 to 100 times richer in converted or unconverted carotene than milk (Dann, 1933).[2] Rosenberg (1942) in his book on vitamins,[3] gives the increment for human and bovine colostrum as two to ten times that of milk. This increment is extremely important to the survival of the newborn and is a strain on the health of the mother. The function of vitamin A is quite well established and the substance itself can be captured and measured wherever found (plasma, colostrum, milk, liver, lymph, tis-

[1]Moore, L. A., and Berry, M. H.: "The Effect of Colostrum on the Vitamin A and Carotene Content of Blood Plasma in New Born Calves." J. Dairy Sci., 27, (October, 1944): 867-873.

[2]Citation, *ibid.*

[3]"Vitamins," by H. R. Rosenberg. Interscience Publishers, New York (1942): p. 59.

sue, feed). Thus, the physiopathology of the carotenoid factor of nutrition is reduced to a simple example in arithmetic—only the clinical phenomena of quantitative insufficiency remain to be distinguished from one another in attributing them to that same remote cause. There is quite a difference in the picture of night blindness and calf scours; of acetonemia of cows and corneal ulceration of dogs; of urinary stones of sheep and roupy chickens; yet *a priori*, independent of the secondary factors involved, the intake of vitamin A cannot be ruled out. The straining of the expectant bovine mother to provide postnatal nutrition to her offspring by storing carotene and vitamin A in her colostrum is an outstanding lesson in veterinary physiology to bear in mind in clinical work.

Terminology of a Notorious Nematoda

When the causal parasite of trichinosis was discovered by Paget in 1835, the Zoölogical Society (England) baptized the nematode, *Trichina spiralis*, but because the generic term conflicted with other members of the subfamily Trichinellidae, the name was changed to *Trichinella spiralis*, and the disease was named trichiniasis, or by some, trichinellosis, but, says Gould in his new book on that subject, the word trichinosis replaced them because it is more euphonious. To be right, "Trichinosis is caused by *Trichinella spiralis*."

Pyrexin

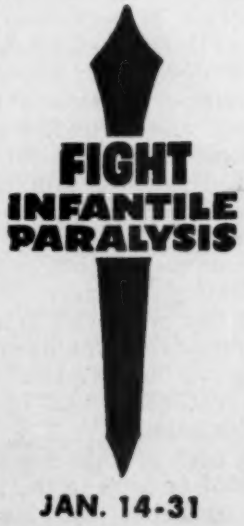
The isolation of an euglobulin from inflammatory exudates that is pyrogenic when injected into dogs and rabbits is a step toward placing fever among the demonstrable chemical reactions. The substance has been named necrosin, a fraction of which is named pyrexin. Suggestion is made that the pyrogenic substance is liberated by the red blood cells and, being found in the blood serum, indicates that the cause of fever must be sought in the chemistry of the erythrocytes. Many a specific fever has its specific blood picture, so why not a specific chemistry? To the biochemists, this explanation may seem stupid, but that's the way it seems from here. Pyrexin may explain much that is not known about fever, a phenomenon that baffled the doctors from 'way back when.

Swine Pox

As a rule, swine pox is mild in Iowa. Death losses are slight. The disease may not be detected until the hogs, restrained for vaccination, expose the presence of high temperature and pustules which have erupted and scabbed over. Apparently these mild cases need not interfere with serum-virus treatment, yet the disease should be regarded as an added risk, even in mildly affected droves. In highly virulent outbreaks, the eruptions may be general, and the mortality may run as high as 50 per cent. In that event, the autopsy shows septicemic lesions, characteristic of an acute virus disease. The virus is transmitted by lice.

Although swine pox affects mature sows, pigs and shotes are mostly affected. The only method of control is to get rid of lice by repeated dipping or spraying. For this purpose, use sulphurated oil. There is danger of toxic accidents from coal-tar dips. The disease runs its course in ten to fourteen days in individuals and from four to six weeks or longer in the larger herds. Little more is known about swine pox.—*R. M. Hofferd, excerpt from Cornell Veterinarian.*

To the question "Is a runt worth raising?" the USDA replies: "Some are; others aren't." Another answer would be: "Small newborns are not all runts."



Saving Animal Lives

The Westerner, livestock picture and feature magazine of Denver, found material for a leading article at the Division of Veterinary Medicine, Colorado State College. Leading off with a facade and interior views of the clinic building, the inquiring reporter labels his material "Saving Animal Lives, Medicine, Surgery, Research at C.S.C. Helps Entire Region" and goes about giving a glowing account of "what's cooking" at the workshop of the AVMA's hard-working president, where everything from the tiniest toy to the toughest ranch bull look alike to the staff of trained trainees. "One of the nation's outstanding medical and surgical centers for large and small animals, domestic and wild" is the scrivener's appraisal of the Fort Collins institute of veterinary learning, a place, he goes on to say, where $40 cows and $40,000 race horses are received by white-gowned men "as though they were human patients in the gravest hour of need," and thereafter accorded all that good hospital management, laboratory technique, and surgical skill can provide. Cited to paint the true picture are an expectant Arabian mare, a ewe just delivered by cesarean section, animals sick from respiratory diseases, horses with corns, and a cow recovering from a Farquharson operation for "hardware disease," all enjoying the ministrations and atmosphere of a spotless hospital (quoting): "a haven for sick animals."

While no part of this excellent article would be rated as news in the precincts of veterinary medicine nor signalized as unique for American veterinary colleges, it is very important that veterinary medicine is getting discovered and looked over, and found amazing by the human mammal. The Fort Collins of Glover and Newsom, Farquharson and Bourne, known quite well for many years in the veterinary circle from coast to coast and over the seven seas, has just been discovered in Denver. That's more than just news. It signifies that folks are looking around to see what's making things click in a nation at war.



—From the Westerner

Facade of the Clinic Building, Division of Veterinary Medicine, Colorado State College

Yucatan Wants Veterinarian for Cattle Disease Control Work

Yucatan desires the services of a trained laboratory investigator to undertake studies on the principal diseases of cattle in that country and to develop methods of combating, them. The veterinarian would be expected to spend some time in Yucatan for the purpose of helping to intensify livestock production by controlling the important tropical diseases which affect cattle there.

Any veterinarian who is interested in the possibilities of this assignment should write to Fomento de Yucatan, Inst. de Beneficencia y Utilidad Publicas, Depto. de Ganaderia, Calle 62, No. 514, Merida, Yuc., Mexico, stating the conditions and salary which would be expected.

If the postwar world needs the people who brought this war upon it, it's a weak world, indeed.

The Biosynthesis of Vitamins and Sulfonamides

The synthesis of thiamin in the rumen is a vital process in transforming crude, fibrous aliment into nutritive material. This bacterial fragmentation has its counterpart in the synthesis of vitamin C and of vitamin K, presumably by the action of coliform bacteria. The production of B vitamins in the rumen by bacterial action is an essential of normal nutrition comparable to the function of the peptic glands, liver, and pancreas in respect to processing rough forage for absorption of its nutritive elements and their parenteral distribution among the cells and fluids of the body. The "bacteria of digestion" take residence in the alimentary canal very early in life and function there as permanently as the secretory organs. Faced with these facts, the bacteriostatic action of sulfonamides must be taken into account in veterinary therapeutics more religiously than in human medicine. The ruminant does not receive much culinary aid.

Tularemia and Undulant Fever

Tularemia and undulant fever are diseases transmitted to man from lower animals. Neither is extensively prevalent among human beings in Illinois, but the risk of each is sufficient to justify preventive efforts. Both may be mild in character, although greatly reducing physical efficiency. For that reason a great many cases undoubtedly escape notification. Both diseases are probably considerably more prevalent in Illinois than case reports indicate.

Undulant fever reaches man chiefly from cattle, although it may originate in swine, goats, and other livestock. It may spread through infected raw milk, or through contact with the carcasses of infected animals. Like tularemia, this infection may take place through abrasions in the skin. It may take place also through the ingestion of germs. Undulant fever is an occupational risk in farm workers, swine and goat herders, slaughterhouse and meat packing employees, veterinarians, and workers in diagnostic laboratories. It is widely prevalent among both cattle (in which the infection is commonly called contagious abortion or Bang's disease) and swine (where it is known as Traum's disease).

Both tularemia and undulant fever may be diagnosed by the laboratory-testing of blood drawn from patients. These tests are often the only means of accurate diagnosis, since tularemia may not infrequently be mistaken for typhoid fever, while undulant fever may simulate typhoid fever, tuberculosis, malaria, influenza, rheumatic fever, and perhaps several other diseases.

The spreading of undulant fever through milk can be prevented by pasteurization.—*Excerpt from Illinois Health Messenger.*

"Animal Health Institute"

"Animal Health Institute" is the name of a new national association of the retail drug trade. One of the purposes of the Institute is "to deal with common problems concerning animal health products." It has twelve member associations in that many states. Arkansas, Florida, Iowa, Illinois, Kansas, Michigan, Minnesota, Pennsylvania, Texas, Wyoming, Wisconsin, and West Virginia have state units affiliated with the AHI. "We feel that in a reasonably short time, this list will be substantially increased," says its Executive Secretary William B. Stone, in *Drug Topics.*

This seems to be the right time and place to say that over-the-counter treatment of sick animals is as much a violation of law as selling dangerous drugs and habit-forming narcotics without a doctor's prescription. Lawyers tell us that it is also unlawful to persuade others to violate law. We believe that but a small proportion of druggists can be lured to wilful violation of the law, yet like all other groups, the drug trade has its racketeers. Chief Inspector George P. Larson, of the Food and Drug Administration, has recently announced that a check-up has to be made of illegal selling of dangerous drugs throughout the country, meaning that there are some persistent violators of law among druggists. That being the case, the service charged with safeguarding animal health has another crime to watch, all the more unfortunate because it's an "inside job."

250,000 soldiers need 1,889,000 tons of supplies every thirty days, or no small stack of War Bonds.

NUTRITION

MATERIAL FURNISHED BY THE COMMITTEE ON NUTRITION

Nutrition Notes

When holding autopsies on pigs receiving a low phosphorus ration, the long bones, especially the ribs, are found to be of a rubbery consistency and will bend abruptly before breaking. They will break like a green stick, with part of the bone still intact. This is exactly opposite to the brittle, easy-breaking bones usually observed in growing pigs and due to a calcium deficiency.

The average amount of iron in market milk is 0.3 mg./kg., or but 1/7 of the amount given in the usual tables of food composition. In an analysis made by Stuttgart's thiocyanate method at the University of Chicago on 61 bottles of milk from 25 companies in 12 communities, the range was 0.114 to 0.650 mg./kg. The mean was 0.319 mg./kg.—*Abst. J. Dairy Sci.*

Iodine and Goiter

The states comprising the Goiter Belt are Ohio, Indiana, Illinois, Michigan, Wisconsin, Nebraska, the Dakotas, Montana, Oregon, Washington, and California, with a population of about 30,000,000. One survey made in Ohio showed a goiter incidence of 18.32 per cent among school boys and 37.69 per cent among girls. Among 168,000 Illinois school children studies in 1928, the percentage was 24.5. Analyses of the water showed the iodine content to vary from 0 to 13 parts per billion. The incidence was highest among the poorly nourished.

The daily iodine requirement is given as 0.002 to 0.004 mg. per kilogram of body weight. The richest sources of dietary iodine are sea food, green vegetables, and milk from nongoitrous regions. Iodized salt is a preventive.—*Illinois Health Messenger.*

Soybean-oil meal, when used as a protein supplement for swine, should be fortified with about 4 per cent bone meal to increase its calcium and phosphorus content. It is very low in calcium (0.28%) and the phosphorus present (0.66%) is only slightly available for swine.

In drylot feeding, a mixture of animal and plant protein has given better results than single ingredients of either, especially for pigs weighing less than 100 lb. Experimental pigs fed an all vegetable protein supplement show an alarming number of "poor-doing" pigs that must be removed from the experiment, even though additional minerals and vitamins have been added.—*Howard Davison: Proceedings Ohio Nutrition Conference.* 1944. p. 58.

Vitamin A and Pig Paralysis

Paralysis in pigs with fracture of the spine in some cases was produced experimentally by feeding a vitamin-A-deficient ration. The experiment, described in the *Onderstepoort Journal of Veterinary Science and Animal Industry,* is abstracted as follows in *Experiment Station Record* (Nov. 1944):

"There was such a softening of the bones that within eighty days 3 of 4 pigs fractured their spines. Other pigs started on the same ration when somewhat older did not develop extreme lesions of paralysis. A ration of skimmilk and white corn was physiologically complete, except that it was lower in vitamin A and calcium. Normal growth and good health resulted when yellow corn and bone meal replaced the white corn. Cod liver oil brought about rapid recovery in most cases."

Diagnosis of Nutritional Deficiencies of Swine

IT SHOULD be recognized that an actual nutritional deficiency in swine may exist without showing definite diagnostic symptoms. Such conditions as reduced appetite and growth, rough coat, wrinkled skin, and general unthriftiness are common to malnutrition in general. Only after a most thorough examination of the herd, premises, feed, care, environment, and the individual animals can a correct diagnosis be made. Many swine herds may show a marked deficiency while receiving proper feed. Internal or external parasitism, mange, improper housing, insufficient feeding or drinking space, shortage of water, infections such as chronic pneumonia, chronic *Salmonella choleraesuis* infection, swine, erysipelas, and subclinical enteritis may be present and interfere with the proper utilization of dietary factors. Only after the entire fields of feed, management, and infection have been weighed are we justified in diagnosing a nutritional disease.

In practice, dietary diseases are usually diagnosed by the process of elimination and by the diligent interpretation of the known natural symptoms produced by the complete absence in the diet of some necessary nutrient.

The acute symptoms produced in the laboratory are seldom if ever seen on the farm. Even the chronic conditions of long standing, caused by the suboptimum intake of a single dietary constituent over a comparatively long period of time, seldom occur under natural conditions. More often, the trouble that stimulates the owner to seek help with his herd is caused by a low intake of two or more essential dietary factors over a comparatively long period, combined with poor animal husbandry. The description of such cases is seldom found in literature. In other words, the practitioner has a limited literature to guide him in the field-diagnosis of nutritional diseases of swine. Symptoms usually described are those observed in experimental animals kept under laboratory conditions, and cover but a single deficiency, whereas deficiencies seen on the farm are usually multiple and result from a low intake of several necessary nutritional factors over an extended period. Such cases, because of lowered vitality, are ordinarily complicated by parasitism and current barnlot infections, which tend to obscure the picture.

To arrive at a correct diagnosis, the practitioner must first know the specific acute



Rickets in an 80 lb. pig caused by vitamin D deficiency.

manifestations of each known deficiency as described by laboratory workers, and then fit those symptoms into the case under observation. After doing this and weighing all collateral evidence, a correct diagnosis can usually be made. If such a systematic plan is followed, the correct diagnosis of nutritional diseases of swine will gradually but surely fit into the routine of swine practices. In this way, the present wide gap between the findings of laboratory workers and the practical application thereof will be bridged.

SYMPTOMS OF NUTRITIONAL DEFICIENCIES OF SWINE*

Protein.—On a grossly deficient diet, the symptoms of protein deficiency are slow or interrupted growth, poor appetite, and impaired reproduction. Sows fed a low protein ration during gestation farrow a high percentage of weak (or dead) pigs that die before weaning time.

Growing shoats develop a characteristic short, chubby appearance and have an excessive amount of fat in proportion to body

*The symptoms given here were obtained principally from the pamphlet, "Recommended Nutrient Allowances For Swine," which is a report of the Committee on Animal Nutrition, National Research Council, Washington, D. C.

weight. Feed consumption is high for the rate of growth.

Calcium.—Calcium deficiency in growing pigs is manifested by reduced appetite, slow growth, long coarse hair, and rough skin that often has a papery, bleached appearance. There is stiffness with enlargement of the ends of the long bones. Calcium tetany, paralysis, and spontaneous fractures of the long bones are common symptoms. Very often several members of the herd will be found down in the rear quarters and unable to rise.

In the breeding herd, reproduction is interfered with and usually results in the birth of weak or dead pigs.

Phosphorus.—Pigs receiving a suboptimum amount of phosphorus show symptoms quite similar to calcium deficient pigs, with the exception of the skin lesions. On postmortem examination, the bones are soft and will bend before breaking in contrast to the brittle bones resulting from calcium starvation. The kidneys are often congested, dark red in color, and may show extensive degeneration. Sudden deaths are not unusual.

Iodine.—As is true with all animals, iodine deficiency in swine is reflected mostly in the process of reproduction. The birth of hairless or weak pigs with goiter is characteristic. A thickness of the throat region, with or without goiter, at birth is very common. In semi-idoine deficient areas, often the only symptoms observed are weakness and a thin silky coat. The newborn have a tendency to leave the bed and then die from exposure. A supressed squeaky squeal is common. This condition has increased many fold since soybean meal has been used extensively to supply protein to breeding herds.

Vitamin A.—The clinical manifestations of vitamin A deficiency of swine are not as pronounced as in cattle. A slight to moderate deficiency does not seriously interfere with the rate of growth. There is usually some stiffness and hyperirritability that may lead to convulsions when suddenly aroused. Some cases have diarrhea. Conjunctivitis, night and day blindness, and incoördination are observed in severe cases. Sows farrow weak and malformed pigs which are often blind. The eyeballs may be missing, either upper or lower jaws only partly developed, and legs or head deformed.

Vitamin D.—The lack of vitamin D in pigs causes rickets. It hinders the absorption of calcium and phosphorus and causes the same clinical symptoms as a deficiency of these minerals described above. The entire bone structure is weak. Growth is retarded while the appetite usually remains normal. A slight deficiency, which reduces the rate of gain without other clinical symptoms, is of common occurrence during the winter months when solar irradiation is low.

Riboflavin (B_2—Vitamin G).—Experimental pigs on a low riboflavin diet fail to gain, have a reduced appetite, vomit, and develop diarrhea. The skin has a thick, wrinkled appearance and is covered with a sebaceous exudate. There is nerve degeneration, yellow livers on autopsy, secretions around the eyes, and cataract.

Niacin.—A deficiency of niacin causes what is commonly referred to as pig pellagra and has been confused with the infectious form of enteritis. The animals develop a rough coat, scour, and die. On autopsy of field cases, a rather characteristic diphtheritic membrane covers the intestinal mucosa.

Pantothenic Acid.—In experimental animals, the following symptoms have been recorded: lameness, poor hair and skin condition, wobbly gait with "goose-stepping", myelin sheath degeneration, and a scurvy condition of the skin.

Pyridoxin.—Pyridoxin deficiency of pigs is seldom if ever diagnosed under field conditions. Its occurrence, however, may be more frequent than realized by swine practitioners.

The common symptoms of malnutrition are present and, in addition, there is lameness and stiffness, diarrhea, hyperirritability that may lead to convulsions, and anemia. Epileptic-like fits are common and may be confused with calcium tetany.

The entire ration of swine, when fed soybean meal, should contain 1/2 per cent of iodized salt, or iodine in some other form, to counteract the goitrogenic effect of soybeans. This is especially important for breeding animals in order to prevent the birth of hairless or dead pigs.

EDITORIAL

This Swine-Medicine Number

The predominance of material on swine medicine in this issue is not a signal that special numbers of the JOURNAL *are in the offing. On the contrary, the steadfast policy of devoting space as impartially as possible among the several heads of clinical veterinary medicine will continue unchanged. The publication of this special number was brought about by a surprising accumulation of excellent material on swine medicine from various sources, namely: (1) the "Panel Discussion on Swine" at the Chicago Session; (2) the prominence given to swine problems at the recent Oklahoma Livestock Conference; (3) original articles on swine pathology awaiting publication; and (4) papers requested to round out the issue.*

Those "State Boards"

In the grapevine system of communication, one frequently hears murmurings about the incompetence of the state boards of veterinary examiners. The ouija boards of the critics are not silent about their incompetence, their political origin, their laxness and rigidity—and even about grafting, racketeering, and tyranny. The state veterinary examining boards, one spokesman declared, are made up of mediocre men who are not qualified to guard the profession against incompetent licentiates—meaning, of course, that only he who taught the applicant for licensure is qualified to pass on the fitness to practice veterinary medicine, even though the said "he" may not know so much about practice nor even about the anticipations of his state. Curiously, scientists of the lofty bracket would like to have fitness to practice measured by the applicant's grades in his particular specialty, which is something quite different from gauging his usefulness to society.

Just what is the truth about these murmurings? Members of the state examining boards are not opposed to laying all the cards on the table, along with the cards of the critics. A great deal may be learned by first reading the address of Dr. Adam P. Leighton before the Annual Congress of Medical Education and Licensure,[1] from which we excerpt:

Our state boards stand by to watch and direct, to guard and oversee this human progress or regress as the case may be. To the medical libertine, the state boards are the despots of tyranny; to the upright, they are the guarantors of liberty. Theirs is a sacred trust to medicine and the medical practitioner. They are the conscience of the profession, the accuser and the judge and executioner of him who betrays the people's reverence for the sanctities of a personal service to health care. They have been maligned and censured. They have been accused of both laxity and rigor; of both venality and weakness; of politics and of a disregard for political claims; of both incompetence and excessive standards; of both partisanship and of pandering to the masses. Yet, accuse them as you will, they have survived the storms of calumny and the buffetings of popular disapproval. They battle ignorance and pretentious learning, prejudice and superstition, self-interest and vested rights. They judge the learned and the medically illiterate; the hypocrite and the hypercritical, the virtuous and the vicious, the criminal and the alleged innocent. With all these functions, they have maintained the freedom and liberty of medicine; of medical education, practice, and research. They have kept a clean profession that is so incredibly clean that popular accusations have exhausted the strength of their own attacks and must now perforce invoke the coercion of political power to ruin the reputation of a profession whose disinterestedness and loyalty to public welfare are too incredibly marvelous to permit of popular acceptance by the skeptical and suspicious minds of a cynical public. Be it said to the credit of the state boards that

[1]The Report of the Committee on Medical Education and Licensure, American Medical Association, 1944.

medicine owes them a debt that is unpayable. They functioned as grandly as they did *because their members were men of the same kind whom they judged* (emphasis ours); men who have ascended to the heights and descended to the depths of triumphs and disappointments of medicine in the care of the sick human being and in the care of the public health.

It has been said of them that they are composed of mediocre men and ambitious men and self-seeking men. To be sure, there have been such men in the state medical boards but it is the system of which I speak. The state boards are a part of the integrated and compact whole, and of a vast system of medicine which, through education and research, has produced the medicine of these United States, the grandest, we are told, and the most effective in the history of mankind. They are the expression of an ideal partnership between society and the government. The men of the state boards are chosen from the rank and file of physicians and their appointment endows them with authority over their colleagues. The boards impersonate authoritatively the collective character of the profession.

At length, the speaker goes on to extol the benefits the nation has derived from the state boards of medical examiners by preserving the standards of the liberties of practice, in spite of coercion and criticism. If they lag behind, they are nevertheless the vanguard of professional competence and the chief opponents of objectionable commercialism. It was the state boards who took medical education out of the doctor's office and placed it in the hands of proud institutions. The address describes perfectly the part played by the veterinary examining boards in the development of veterinary medicine in the United States since they were established at the close of the nineteenth century. Their achievements have far exceeded their faults as boards, despite the mediocrity of some of their members. The state board system is something to improve, not to abolish. Moreover, in the political sense, there is inconsistency in preaching states rights out of one labial commissure and centralization out of the other.

In Britain, there were not, even before the war, enough veterinarians and the Loveday Committee on Veterinary Education, in their report, formulated plans for increase of their numbers and improvement in their education.—*From British Information Service, New York City.*

Consumption (=Human Pulmonary Tuberculosis)

It seems apropos to sharpen our wits on tuberculosis from time to time. The incidence is mounting among the debilitated populations of war-torn Europe but its successful reduction to a negligible figure in cattle in this country tends to leave us serenely unaware of this serious disease of farm animals. The ravages of animal tuberculosis were never fully realized among American practitioners. When brought into the limelight, its eradication in cattle soon began and kept us off guard in the field of practice. Except for reports of police work and statistics published from time to time, the general practitioner is now little concerned over tuberculosis, gratifying as it is to recall that animal pathologists have always held that the tuberculous cow was a menace to public health, while the human pathologists argued, for a time, that there was no relation, whatsoever, between the byre and the home in this connection. Hadn't Robert Koch, German ace of "O.T." tuberculin fame, said so? And, didn't the agricultural intelligentsia second the motion?

But, Wrong can't win over Right on the long pull. By 1908, Robert Koch had revised his postulate. He came over to Washington (1908) and admitted that (and we quote)[1] "the bovine tubercle bacilli might have sufficient virulence to cause local glandular lesions but are not sufficiently virulent to cause human pulmonary tuberculosis." He had yielded that much. The British Tuberculosis Commission (1904), A. S. Griffith reporting, agreed, and Europe decided to live on with its bovine tuberculosis while American veterinarians dissented and set out to do something about it. In short, Koch did not succeed in stopping bovine tuberculosis eradication in the United States, no more than Hitler is stopping the G.I.'s on the Rhine. He only delayed matters by removing the tuberculous cow from the etiology of consumption and surrounding himself with an army of his advocates in agricultural and medical science. Koch's was a technical error of the first rank in animal industry. What it cost in human lives and crippled children and hunchbacks

[1]Editorial: "Pulmonary Tuberculosis of Bovine Origin." J.A.M.A., *126*, (Oct. 1944): 435-436.

we leave the medical statistician to figure out.

Whatever credit medical science accords Koch for bringing the tubercle bacillus into visual prominence on the slides of his microscope is not challenged. Thanks to veterinarians, Koch's tuberculin came into use as a diagnostic agent, but what his philosophy cost the livestock industry of the world is incomputable. Perhaps, Europe would now be as free of bovine tuberculosis as the United States had Koch not expounded the erroneous doctrine that human and bovine tuberculosis were positively not interchangeable infections, even though his contemporary bacteriologists (British) did concede that 1.5 per cent (4 out of 266) of samples of sputum from human consumptives showed the bovine type of infection. Later, the same authorities raised the ratio to 3.4 per cent of 241 samples cultured and typed. One Scotland community recently studied showed a ratio of 25.8 per cent of human tuberculosis cases with the bovine type of organism, and another with 9.1 per cent. The average for Scotland was 5.2 per cent and for all of England, 2 per cent. This is not innuendo toward the countries named. Equally convincing figures would probably obtain for our own country, although it is presumed that the ratio is lower in the United States owing to the eradication of bovine tuberculosis (Hagan[2]) and the pasteurization of cows' milk.

The purpose of this piece is to draw a verbal caricature of the human-bovine tuberculosis situation from the preceding figures. The pictures would show hospitals for human pulmonary tuberculosis in which there would be, for each 100 cots, 25.8 patients suffering from the bovine type of infection in one row, 9.1 patients in another row, and so on down to the lowest figure of 2 per hundred. In short, the picture would be a never-to-be-forgotten scene of the potentiality of the tuberculous cow, which the veterinary service of the United States has practically eliminated.

[2]William Hagan: "The Infectious Diseases of Domestic Animals." Comstock Publishing Company (1943): p. 245.

The AVMA Program

Because the most powerful enemies of human subsistence are the diseases of domestic animals—and not perhaps—worrying over the future of veterinary medicine in a vast agricultural country like the United States would not be justified if the small group engaged in promoting veterinary science and its various applications were solidly united into an energetic task force determined to accomplish its full purpose. With the mounting drain on natural resources of an ever increasing population, representing that many stomachs to feed, what could be more promising than a happy tomorrow for a profession founded upon the conquest of animal maladies? But, being only a small unit in a big drama, unity of action is more imperative than in any other group working in the "department of subsistence." To achieve its purpose, the uses of veterinary science must be gathered in, not parceled out. That is the basis of the AVMA program.

Plans for Returning War Dogs

Plans have been developed by the Army, the Treasury Department, and Dogs for Defense, Inc., to assure every Army War Dog of the K-9 Corps a proper home when it is returned to civilian life.

Under the original policy through which dogs were secured for the Army, the first step after their "de-militarizing" will be to offer them to their original owners. If the original owners indicate they desire the return of the dogs, they are returned to them at no cost.

In the event the original owners decline to accept return of dogs or no answer is received within three weeks, the dogs will be disposed of by the following procedure:

1) They will be declared as surplus by the Quartermaster Corps, which will notify the Office of Surplus Property, Treasury Department, of their availability for sale to the public, together with a description of each dog, a statement of its temperament, a resume of its war record, comments by its handlers, and a recommendation as to the type of home most suitable.

2) The Treasury will announce the availability of the dogs for purchase at a minimum cost for the dog, and for handling and transportation which will vary from about $15.00 to $25.00, depending on the location of the prospective purchaser.

3) Requests from prospective purchasers of these dogs should be sent to Dogs for Defense, Inc., the nonprofit civilian

agency set up originally to secure dogs for the Army. Each request will be investigated to insure that the prospective purchaser is in a position to provide the dog a proper home. A report on prospective purchasers will be submitted to the Treasury Department.

4) If Dogs for Defense, Inc., reports that the prospective purchaser of a dog is in a position to provide the dog with a proper home, the Treasury Department will begin negotiations to consummate the sale; if Dogs for Defense, Inc., renders a negative report on the prospective purchaser, the Treasury Department will withhold sale until another request is received and the same procedure is repeated to a successful conclusion.

"Although there are no clear-cut precedents in Army procedure for handling a situation of this kind . . . . no dog will be released from Army custody until every effort has been made to insure its return to civilian life under the best possible circumstances."

Pending the setting up of this machinery for returning war dogs to civilian life, dogs of the type no longer needed by the Army are being "de-militarized," and held at the Quartermaster War Dog Reception and Training Center, Fort Robinson, Neb.

The Oklahoma Livestock Conservation and Production Clinic

In the section "Among the States" under "Oklahoma," there will be found the technical program of a noteworthy event. Prominent figures of America's basic industry were convened in Oklahoma City under the sponsorship of the Governor and his entourage of livestock and agricultural interests to launch a project (and we quote): "To focus attention on the tremendous wastes of labor, poultry, dairy, and animal products and the resulting financial loss to livestock and poultry producers in the Southwest due to the ravages of disease, parasites, and improper handling of livestock; to bring producers, industry, and educational agencies in this area the most recent findings and developments for the conservation and efficient protection of livestock and poultry . . . . . to formulate a unified action program that will stimulate and increase the use of conservation measures for more proficient production of livestock and poultry in this area during the postwar period; to discuss possible adjustments in livestock production methods that may become necessary in the postwar period; to determine as nearly as possible what the future holds out for livestock and poultry producers in the Southwest and to develop factual information as to how these industries can best meet the situation; to establish a pattern of coöperation among all segments of the livestock and poultry industry interested in the advancement and welfare of these great enterprises."

The stated purpose of assembling the nation's talented stockmen at Oklahoma City conforms so closely to the basic objectives of veterinary medicine, and the veterinarians called in to participate in Governor Kerr's program were so numerous and the subjects they discussed so significant, that the conference testifies to the importance of veterinary science in the national picture—to the fact that when stockmen of talent and experience assemble to confer on the "conservation and production of livestock and poultry," disease and parasites are no longer overlooked. Since the founding of formal veterinary education, its theme has been that successful conservation and production of farm animals are dependent on the control of diseases and parasites among them. On that account alone the Oklahoma "clinic" is a tribute to its sponsors.

Captured Japanese Rations

Certain types of foods familiar in American grocery stores are found in the Japanese emergency rations, among them canned crabmeat, salmon, tuna, mandarin oranges, pineapple and other fruits, rice, tea, and sugar. If in good condition, their use is recommended. Other items such as dried fish, seaweeds, pickled radishes, precooked rice flour are mostly distasteful to American soldiers and are recommended only where rations are short.

A Japanese soldier in garrison appears to eat twice as much as his family at home. It is erroneous to suppose that Japanese subsist mainly on rice and fish, as do the home folk. The ration of Japanese troops is based upon meat, fruits, vegetables, and sweets. At home, the Japanese use these

only to flavor their rice-fish diet. On the whole, however, the Japanese ration is inferior to that of the Americans. In the rear echelons, the Japanese soldier cooks his own food, usually enough for twenty-four hours. The following is an official report (source withheld on request) on the Japanese ration:

Canned roast beef, corned beef, beef-and-vegetable mixture, and pork-and-vegetable mixture. Canned vegetables (in meat mixtures)—beans, bean sprouts, peas, bamboo sprouts, spinach, water chestnuts, rice in compressed cakes or cooked with red beans; canned cherries, plums, peaches, pineapple, pears, and oranges; canned eggs (hard boiled ones found in a naval emergency ration). Among the dehydrated vegetables, there are beans, potatoes, peas, cabbage, carrots, onions, radishes, mushrooms, burdock, seaweeds, taro root. The latter is the basis of Hawaiian *poi*. There is dehydrated fish of the mackerel family. Of condiments and preserves there are soy sauce, bean paste, dried plum cake, pickled giant radishes, butter, and jellies. The staples include polished or unpolished rice, granulated sugar, salt, biscuits or/and crackers. The beverages are tea, milk (condensed or powdered), cider and whiskey, and the sweets caramels, hard candies, and chocolate.

Many of these fit into the American ration, others are well-known articles of the U.S. Chinese restaurants.

COMBAT RATIONS

On going into action the Japanese soldiers carry rice and bags of biscuits, and perhaps canned meat, specially packed in brown crepe paper or in a transparent wrapper tied at both ends with a string. The first package contains cakes of wheat or barley, sugar, dried fish cake, salty dried plums. The cakes can be eaten as they are or cooked into a breakfast cereal. The second contains two cakes of compressed fish-and-vegetable mixture, a sack of finely milled precooked rice flour which is not palatable to Americans but may be used in emergency.

The canned goods come in wooden boxes bound with grass rope. The rice, flour, sugar, and salt are packed in burlap bags. The liquid soy sauce is shipped in wooden barrels and the powered form in gallon cans. The dehydrated goods are transported in large rectangular cans.

The printed report contains interesting items on special rations and the precautions American troops must take in the absence of medical officers capable of approving the use of captured food. The Quartermaster General advises the fullest use of captured Japanese food after it has been approved by competent food technicians. Says the document, "It is foolhardy to waste supplies, even of the enemy."

From America's Largest Military Mission

Stamped "Passed for Publication by the U. S. Army Press Censor" for China, Burma, India, the following was received the last week of November:

Y-Force Operations Staff, Southwest China.—Major Warren L. Skinner (KSC '38), 28, on leave from his position as instructor in veterinary medicine at Kansas State College, is now on duty with a Field Artillery Training Center operated in southwestern China by the Y-Force Operations Staff, America's largest military mission.



Major W. L. Skinner, of the veterinary faculty of Kansas State College, on duty in southwestern China.

In this training center, U. S. Army instructors teach Chinese combat units the operation of American pack artillery, with which they are furnished. A considerable part of the training also is concerned with proper care of the pack animals—hardy, stocky, little native Chinese horses and mules.

Operating this Field Artillery Training Center is part of the mission of Y-Force, headed by Brigadier General Frank Dorn. The operations staff trained and supplied

the Chinese Expeditionary Force for their current Salween campaign, aimed at driving the Japanese from west of the Salween River and reopening the Burma Road in China. Besides training and furnishing certain supplies to the C.E.F., Y-Force sends medical, veterinary, and certain technical assistance and advisers into the field with combat units.

Major Skinner's wife is making her home at Sedgwick, Colo., while he is overseas.

He was inducted into Army service March 4, 1940, and has been in the China-Burma-India theater less than a year. For his services with Y-Force Operations Staff, Major Skinner is entitled to wear a bronze star on his Asiatic campaign ribbon.

Technical Criticism

Out-in-the-open criticism of material published in the veterinary journals of former days has been replaced by a sort of grapevine criticism, contrary to the custom of the old authors to come out in the next issue with sizzling diatribes against anything that did not agree with established fact or suit personal fancy. Whether the change is up or down depends upon the point of view. Minus impolite sarcasm, personal slamming, and strong adjectives hurled at erring authors in the printed word, the old way had its advantages. Unpleasant as it is to write technical criticisms, the veterinarian of these wartime days errs in not doing so as an obligation. Criticising scientific articles has a dual purpose: (1) keeping the records in order, and (2) separating factual from controversial material. On this score, the veterinarian of 1944 is gentle as a jenny wren compared with the eagle-like conduct of his grandad. The old veterinary authors may have been impolite but they *did* sign their criticisms.

Predicts Shortage of Pork

In the attempt to divert feed to other livestock, the government planned a reduction of hogs up to 20 per cent, or down to around 56,000,000 head. Now faced with a threatened shortage of lard, the WFA has increased the quota to 60,000,000 which, says the *Chicago Journal of Commerce*, is going to bring about a shortage of pork in 1945, despite the big corn crop of 1944. As of December, 1944, the spring and summer hogs are already used up, owing to heavy shipments overseas.

Grande Merci Madame

A short poem by Harriet Gray Blackwell portrays the work of the veterinarian in its highest estate—the spirit of kindness to the helpless creatures of the earth. Clippings of the poem from *The Evening Star* (Wash., D. C.), of Nov. 23, 1944, were sent to us by Dr. John R. Mohler and Wm. C. Woodward, M.D., of Washington, D. C. Dr. Woodward submits the poem with a letter suggesting that it "might interest you and possibly be thought worthy of publication in your JOURNAL." To this we reply that no higher compliment could be paid to the work of the veterinary profession than to point out its inborn trait of playing fair with animals without boastful fanfare or mental reservation, whatsoever. But seldom is the reward as generous as that contained in the following verse:

Veterinarian

He is a quiet man as though he spent
His youth within a whispering, secret wood.
Communing with small creatures and content
With elemental life which he found good.
He did not hate the fox who tore the wing
Of a speckled thrush, guarding her nest too long,
Instead he mended the hurt and timid thing,
Biding his time until he heard its song.

If he had sworn the Hippocratic oath
His skillful hands might well have brought him fame,
Yet he pursued his natural bent like the growth
Of forest trees, remembering the name
Of Francis of Assisi, gentle saint
Who ministered to every creature's plaint.

In mulling over the scientific, economic, and professional phases of veterinary practice, little thought is ever given to claiming credit for participating in the biggest of humane societies—the veterinary profession in its everyday work from the caged canary of the modest home to the pastoral herds of the open range. A lyric on the sum of kindness to animals meted out by veterinary medicine remains to be written.

CURRENT LITERATURE

ABSTRACTS

Trichinella Skin Test

Autopsies held in a North Carolina area for detecting the presence of trichinosis showed an incidence of 2.8 per cent but among 700 hospital and sanitorium patients in the same area, 10 per cent of them reacted to the skin test. The study confirmed the results obtained by other investigators. The difference was not unexpected since positive reactions may occur whether the infection is light or heavy, or the larvae are dead or alive. The incidence was found to be slightly higher in the Negro and in males, and there was no essential difference between urban and rural patients. In tuberculosis sanatoria; 14.3 per cent were positive as compared with 7.1 per cent in general hospitals. This discrepancy may be due to unrecognized endemics or to increased reactivity of tuberculous subjects.—*Abstr., Canad. J. Pub. Health, 35, (Sept. 1944): 375.*

Nutrition Requirements of the Dog

The dog is regarded as a valuable laboratory animal by the physiologist and the student of nutrition. It has been used extensively in determining properly balanced diets beginning with the early experimental work on rickets and vitamin D, and was notably instrumental in isolating the antipellagra fractions. Its caloric requirements approach those of man. A dog of 13.5 kg. needs 80 calories per kilogram per day; a child of 10 kg., 100 calories per kilogram. Other workers give the caloric need of a 50-lb. dog as 49 calories per kilogram daily. Needless to stress the direct relation of body surface, growth, gestation, and lactation to caloric requirements. In rations otherwise balanced, the carbohydrate requirements may vary from 12.5 to 70 per cent without harm. Dogs digest both raw and cooked starch, quantitatively. The popular objections to starches may have arisen from dog biscuits which cause fright disease (hysteria), the causative factor being toxic ingredients, not starch. The optimum fat requirement has not been established. Dogs thrive on rations ranging from 40 per cent to 0.13 per cent of fat, where the ration is otherwise adequate. Being classed as carnivorous, meat and other protein foods have been given the greatest attention in the feeding of dogs. Recently, more attention has been given to the amino acids released in digestion. Dogs grow well on a mixture of tryptophane, lysine, histidine, phenylalanine, leucine, isoleucine, threonine, methionine, and valine. Adequate amounts of these nine amino acids are supplied for growing pups by rations containing 18 to 22 per cent casein. The amount of any other protein required depends upon its digestibility as well as upon the amino acids contained —important properties in commercial dog foods, which are now limited to 24 per cent protein (8 per cent from animals) on account of the current shortage.

In the vitamin segment, the focal points are A, D, and E, with some attention to preformed K, and, of course, the imperative B fractions (thiamin, niacin, riboflavin, pyridoxine, pantothenic acid) each of which guard over vital processes, too numerous to discuss here.

On the mineral side, the dog has definite needs of calcium, phosphorus, sodium, chlorine, potassium, magnesium, iron, copper, iodine, and obviously, such trace elements as cobalt, manganese, and zinc. The Ca-P ratio of 1.2 : 1 appears to be the favorable one for dogs. The iron and copper requirements are given as 1 to 3 mg. and 0.2 to 0.6 mg. per kilogram of body weight, respectively.—[*L. Michaud, D.V.M., and C. A. Elvehjem, Ph.D., The Nutritional Requirements of the Dog. Nutrition Reviews, 2 (Oct. 1944): 298-302.*]

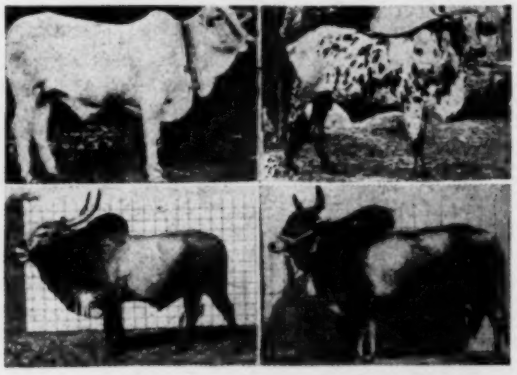
Chronic Congenital Manganese Deficiency in Chicks

Hens were fed with a manganese-deficient diet and the effects on their offspring observed up to maturity. The basal diet contained 6.3 μg per gram and the controls received a diet containing no less than 50 μg per gram. For the first trial, 14 hatches were studied for five months; for the second trial, 12 hatches for seven months; and for the third trial 9 hatches for ten months. The ataxia produced resulted in spasms of the opisthotonos, emprosthotonos, and pleurothotonos types, mostly of the first type, however. These manifestations continued with diminishing severity and incidence up to

maturity and without complete recovery in any case. The symptoms were similar to those of thiamin deficiency. The importance of the study is that the offspring of the ataxic generation did not inherit the disease but developed normally after hatching. The ataxia was, therefore, due to maternal manganese deficiency not to inheriting a recessive character—*C. D. Caskey, L. C. Norris, and G. F. Heuser, Cornell University: A Chronic Congenital Ataxia in Chicks due to Manganese Deficiency in the Maternal Diet. Poultry Sci., 23, (Nov. 1944): 516-520.*

Indian Cattle

An excellent article on the cattle of India *(= Bos indicus)*, illustrated with some 50 pictures, is featured in a current issue of *The Cattleman*, educational magazine of the cattle industry of the Southwest. The piece is a contribution of the senior geneticist of the U.S. Bureau of Animal Industry who writes from personal observations in India and China



—From The Cattleman

Breeds of Brahman Cattle Selected at Random.

which, incidentally, sheds light on that part of the agricultural situation of Oriental dominions brought near by the war.

While American veterinarians are not entirely unfamiliar with humped cattle, our knowledge of them is superficial, limited to a few scattered herds mainly in Texas. The USDA has adopted the name "Brahman Cattle" for all breeds of the species *indicus* and recognizes the four breeds, Gir, Guzerat, Krishna Valley, and Nellore, described by Parr of the Department in 1923 *(Farmers' Bull.* 1361, 1923) and named mainly for their geographic sources. "Zebu" is also used. The contribution serves the purpose of naturalists, and of interested livestock producers. The descriptions are of 5 groups showing the variegated color schemes, patterns of horns and humps, and considerable exterior anatomy of what is reputed to be a superior species of powerful draft cattle indispensable for Indian farming, not famous for milk nor being utilized as food, through an age-old custom of a vegetarian population. Bullocks and cows of the Gir and other breeds, weighing nearly two tons, are of record, and they grow to these weights with amazing rapidity (280 to 375 days).—[*Ralph W. Phillips, U.S. Bureau of Animal Industry: The Cattle of India. The Cattleman, 31, (Nov. 1944): 11-16 and 40-41.*]

Canine Sensitivity to Ascarid Antigen

Past evidence showed sensitivity of dogs to ragweed antigen. Ascarid antigen is known to sensitize man. The writers tested intracutaneously 24 dogs from 2 months to 3 years of age with dog and pig ascarid antigens. Positive reactions occurred in 12 dogs, most of which showed or previously had ascarid infections. Passive transfer of ascarid antibodies in the blood serum of a sensitive dog to other dogs was successful in four or five attempts. Positive passive transfer was also made from two dogs to two men. Active sensitization of two dogs with pig ascarid antigen was successful. Skin-sensitizing antibodies in the serum of a dog were destroyed by heating for thirty minutes at 56C. (132 F.).—(*Brunner, M., Altman, I. and Bowman, K.: Canine Sensitivity to Ascarid Antigen, J. of Allergy,* 15, (*Jan.*, 1944): 2-28.) Abstracted by E. A. Benbrook, Ames, Iowa.

The Dairyman's Viewpoint on Mastitis

Reports on the drug treatment of bovine mastitis have given dairymen a false sense of security and unwarranted hopes because the responsibility in the control of mastitis rests with "the man with the cows." Contributions from the field of veterinary medicine have been of significant help but without a thorough understanding by the dairyman of the disease and the sanitary problem involved, there is little hope of bringing the disease under control. An educational program based on fundamentals should be planned and carried to him. This comprises an understanding of the structure and function of the mammary gland; the cause of the disease and the way it spreads; the causes of lowered resistance; the effects of the disease on the gland and the milk; practical methods of diagnosis; the effects of mastitis on milk production and quality; sound management; and milking practices which control the severity and spread. The dairyman with a working knowledge can best utilize the services of the veterinarian, the author points out.—[*T. S. Sutton, Editor, Journal of Dairy Science, Ohio State University: "Mastitis from the Dairyman's Viewpoint." J. Dairy Sci., 27 (Aug. 1944): 609.*]

Books and Reports

Veterinary Director General's Report

Summed up in the 1944 report of the veterinary director general, the animal-disease situation in the Dominion of Canada remains famously favorable. Of anthrax, dourine, glanders, and sheep scabies there are none. The 5 outbreaks of hog cholera involving but a few head in herds scattered from Nova Scotia to Manitoba were quickly stamped out. But for 7 individual cases in the eastern provinces, there was no horse mange. The 1943 outbreak of rabies in Ontario has not been eradicated, since 18 canine cases and 1 feline case occurred in that province during the year. Tuberculosis and brucellosis control continues on the accredited herd and area plan. The low incidence of animal diseases in the Dominion is told in the low percentage of carcasses condemned by the veterinary inspectors: cattle, 1.07 per cent; sheep, 0.39 per cent; swine, 0.23 per cent; poultry, 1.53 per cent.

The report confirms the criticism of Dr. Chas. A. Mitchell (*Canad. J. Comp. Med.*, Oct. 1944) that official veterinary functionaries of the Dominion are too far removed from administrative heads. The report is from Veterinary Inspector Barker to Director of Production Service Hammer to Minister of Agriculture Gardiner—an exasperating example of the increasing complexity of governments, nowadays, that frustrates the veterinary service. —[*Report of the Veterinary Director General for the year ending March 31, 1944, edited by M. Barker, V. S. 35-page booklet. Department of Agriculture, Ottawa, Ont.*]

Trichinosis

Despite the voluminous literature on trichinosis since the writing of the Mosaic injunctions some fourteen centuries B.C., important fundamental principles of preventive medicine press themselves upon the mind in the reading of this book. Thirty-one pages of bibliography, from 1822 to date, testify to the magnitude of the task involved. It has always seemed quite a chore to remind the world of medicine that many species of animals are carriers of a nematode harmless to them but deadly for man. Authorities do not doubt that *Trichinella spiralis* is responsible for the proscriptions of Moses, although the worm itself was not discovered until 1835. Meanwhile, apart from the ancient laws of the Jewish faith, trichinosis has been called "man's most dangerous enemy" (Paget, 1835), "that terrible trichina demon" (Rupprecht, 1865), and "a major public health problem in the United States" (Hall, 1938).

This book is "must" reading for the veterinary profession because its author has assembled all the known facts about a disease that is transmitted to luckless human beings by one of the principal sources of the human dietary —a disease of the hoglot that has challenged the livestock sanitarian and meat inspector and public health officials for centuries and is particularly significant to the American veterinarian because, according to surveys of Hall, Wright, Schwartz, and others, trichinosis of swine is more prevalent in the United States than in other countries.

As a point of departure for a task undone and an epic of fact free of exaggeration, this book belongs on the shelves of every veterinarian's library, on the desk of every veterinary research laboratory, in every veterinary class room, and in every high school, since it is a collection of information on a grave animal disease that can be obtained only in scattered places.

The material is divided into 13 chapters: Historical, 17 pages; Life Cycle of *Trichinella spiralis*, 11 pages; Morphology of *T. spiralis*, 22 pages; Epidemiology of Trichinosis, 12 pages; Trichinosis in Animals, 8 pages; Pathology of Trichinosis, 60 pages; Immunology, 32 pages; Laboratory Diagnostic Methods, 24 pages; Symptomatology, 48 pages; Diagnosis, 24 pages; Treatment, 15 pages; Prognosis, 5 pages; and Control Measures, 10 pages.

The historical sketch contains eight portraits of nineteenth century pathologists, who finally unveiled the secret hidden for centuries in Golgotha of calcareous cysts seen in their postmortem work, together with the part they played in disclosing the nature of this baffling disease.

The diplomatic controversy with Germany—notorious faultfinder with everything American—during the 1880's, 1890's, and beyond, is well told and is historically exact, as is also the recent investigational work of Hall, Wright, and Schwartz. It is noticeable that except for the work of these veterinarians and that of Railliet of Alfort, the researches on trichinosis were conducted by human pathologists, and naturally so, for, animals are vectors rather than victims of *T. spiralis*.

Dr. Gould has furnished a precious guide for food hygienists, livestock sanitarians, meat inspectors, teachers, and practitioners, which will be universally praised, but he misses the opportunity of picking up all the strings of the classical text and tying them into a knot for the public health service to unsnarl in the presence of angry farmers and garbage feeders. —[*Trichinosis. By Sylvester E. Gould, M.D., D.Sc., Pathologist and Director of Laboratories, Eloise Hospital, and Assistant Professor of*

Pathology, Wayne University College of Medicine, Detroit. Cloth. 356 pages. Illustrated. Charles C. Thomas, Springfield, Ill. 1945. Price $5.00.]

Interchangeability of Tuberculosis

Knowledge of what's what in the interchangeability of tuberculous infections from animals to man and *vice versa* comes to the veterinarian from the medical profession, because the animal pathologist must halt when his research leads him onto the inner precincts of the human mammal. So, seldom if ever, has the exclusive animal bacteriologist been qualified to report research work of his own, showing the transmission (1) of the human bacillus to cattle, (2) of the bovine bacillus from man to cattle, or (3) of the bovine bacillus from man to man. The information that floods veterinary literature in regard to these interchanges is copied. This, however, does not signify that there has been no comprehensive, coöperative work between the two professions, for in certain countries (*e.g.* Denmark) where the incidence of cattle tuberculosis is high, topographic studies of physician and veterinarian have shown convincingly a corresponding percentage of human cases, not only among children, but also among adolescents and adults. On this account, the booklet recently received from Malmö, Sweden describing work of a veterinary laboratory in association with the Swedish National Society Against Tuberculosis, is an extremely interesting document, since, in addition to dwelling upon the orthodoxy of the control of tuberculosis in cattle, actual cases are cited of the transmission of (1) bovine infection from cattle to man, (2) of the human type from man to cattle, (3) of the bovine type from man to cattle, and (4) a human case of bovine conjunctival tuberculosis.—[*The Relation between Bovine and Human Tuberculosis from the Veterinary Point of View. by Prof. Hilding Magnusson, Director of the Bacteriological Laboratory of the Agricultural Society, Malmö, Sweden. Helsingfors. 38-page, card-bound reprint,* 1941.]

Report of the Ontario Veterinary College

The report of the Principal of the Ontario Veterinary College to the Minister of Agriculture for the year ending March 31, 1944, gives the enrollment as 136, representing all of the provinces of the Dominion, other points of the United Kingdom, and the United States; shows a staff of 26 functionaries; indicates the entrance requirements and degrees conferred and describes briefly the courses given and the extra-curricular services rendered.

The matriculation requirement is one year of college work; the course is five collegiate years, and the degrees conferred are B.V.Sc., M.V.Sc., D.V.Sc., and D.V.P.H., the latter three for graduate work in the School of Graduate Studies of the University of Toronto, of which the college is a part. A special course in public health was given to the senior students by the University staff; one on fur breeding was provided for that industry, and another—a refresher course—was given to veterinarians.

The clinical service for horses, cattle, swine, sheep, small animals, and fur bearers comprised extension work on bovine brucellosis; diversified research and investigation; laboratory diagnosis; distribution of 5,800 doses of *Brucella abortus* antigen and 105,050 doses of fowl pox vaccine; 82,435 agglutination tests; 700 routine milk examinations; and correspondence and interviews on these fields of veterinary medicine. Increased interest in poultry medicine was shown by the large number of specimens submitted for examination. The report is rounded out with accounts of cases of unusual interest among which are: (1) deaths from intravenous injections of Strain 19; (2) an anaërobic streptococcus from cases of bovine mastitis; (3) bovine pulmonary emphysema; (4) acidophilus milk as a preventive and treatment of lamb scours; (5) embryonal nephroma in fowl; and (6) clinical reports including bovine coccidiosis, cobalt deficiency in cattle, vitamin B deficiency in pigs, lead poisoning in cattle, hydrogen sulfide poisoning in young cattle, among other chosen subjects. The report of the provincial zoölogist includes diseases of fur bearers, plant toxicology, fox distemper, and elk liver fluke in cattle.

A report of great merit, crammed with useful information, characteristic of the author and illustrious pioneers in formal veterinary education.—[*Report of the Ontario Veterinary College (1943-1944). By C. D. McGilvray, Principal. 32-page pamphlet. Printed by order of the Legislative Assembly of Ontario.*]

Medical Education in the United States and Canada

The Council on Medical Education and Hospitals of the American Medical Association publishes a bound 90-page reprint of articles from the *Journal* on the subjects which cover the problems of major importance in medical education of the two countries. Obviously, the material is assembled for the convenience of the many interested in the educational field, its objectivism, statistical records of progress, names and history of the approved medical and pre-medical schools, internships, residencies and fellowships, state boards, and over-all picture of the medical profession, as of 1943-1944. —[*American Medical Association, 535 North Dearborn Street, Chicago.*]

THE NEWS

AVMA Activities

Board of Governors, Executive Board, and Committees Meet in Chicago

Beginning on December 1 and extending through December 8, 1944, a number of executive and informal sessions of AVMA organization elements were held in Chicago during the various livestock production, sanitary, research, and related group meetings.

The Board of Governors—W. A. Hagan, chairman, James Farquharson, and B. T. Simms—was in session on December 1-2. The Executive Board held its semiannual meeting on Sunday, December 3, and was attended by Drs. Hagan, Farquharson and Simms; also by Drs. S. F. Scheidy (district 2), L. M. Hurt (district 6), Ashe Lockhart (district 8), W. R. Krill (district 10), and C. C. Hastings (member-at-large).

TENTATIVE PLANS FOR 1945 CONVENTION IN CHICAGO

Among other business items, the Executive Board made the following general plans for the 1945 annual session:

Dates: Aug. 21-24, 1945
Headquarters: Palmer House, Chicago

The arrangements for the next annual meeting are of necessity somewhat tentative at this date. However, if travel and hotel facilities permit, a four-day session will be held including exhibits and other regular features. It is planned to hold section meetings in 1945 if the officers of the sections so desire and can arrange suitable programs. Section meetings were not held in 1943 and 1944, and there is considerable desire on the part of some of these officers to resume their sessions as soon as feasible.

Other association committees which held either executive or informal meetings during the week included the Standing Committees on Education, Resolutions, Proprietary Pharmaceuticals, and Nutrition; and the Special Committees on Rabies, Vital Statistics, Food Hygiene, Milk Hygiene, Diseases of Dairy Cattle, and Diseases of Swine.

The Special Committee on Postwar Planning met for two days, December 4-5, and was attended by Chairman H. L. Foust and Drs. J. A. Barger, Cliff D. Carpenter, Kenneth G. McKay, V. C. Pauhlman, W. H. Riser, Chas. A. Mitchell, M. M. Leonard, and Col. L. L. Shook. Also in attendance at some of the committee sessions were President Farquharson; Chairman W. L. Boyd, Committee on Education; Chairman C. F. Schlotthauer, Committee on Public Relations; W. R. Krill; C. W. Bower, and Executive Secretary Hardenbergh. The committee developed considerable information on refresher and post-graduate courses for discharged veterinary officers, interneships, extension of veterinary service to marginal areas, and other important aspects of the Committee's problems.

The Research Council was in session on December 5 but, lacking a quorum, transacted no formal business.

The Committee on Foods of the AVMA-AAHA met on December 5 and developed a proposed revision of the Committee's activities, which will be presented to the respective associations later for consideration and approval.

New Series of Radio Programs Begins in January

The marked success of the radio programs on livestock health, which were sponsored during the first six months of 1944 by over thirty state and provincial veterinary associations, with the coöperation of the public relations department of the AVMA, has led to a renewal of this activity in 1945. For the past several weeks, scripts for the radio presentations have been in preparation, the basic material for the various subjects being furnished by the chairmen and members of several committees and by other individuals selected for the purpose.

The new series will consist of at least 26 scripts, or enough for six months of weekly broadcasts. The subjects will cover diseases, parasites, and nutritional problems of domestic animals and poultry in a somewhat more detailed form than the general topics which made up most of the previous series. As already mentioned, the basic matter for each talk has been prepared by one or more authorities on the subject, and then put into radio interview or address form by the AVMA public relations department. The scripts are then edited by the individuals concerned and, when finally approved, are mimeographed and distributed to associations using the broadcasts. They are from seven to ten minutes in length,

which is the time that most stations find suitable for presentation on their farm radio hours.

The talks and interviews are intended primarily for livestock and poultry growers, dairymen, and farm audiences in general. Excellent coöperation has been received from program directors of leading stations from coast to coast who have looked upon this series of veterinary association sponsored programs as a public service to their listeners, and have therefore been glad to contribute the required radio time.

At the time of going to press, some twenty associations have arranged to use the 1945 programs and, in all probability, the total will reach the 1944 figure. This activity is an important public relations service by and for the veterinary profession and in the interests of the livestock industry. Veterinarians throughout the country are urged to inquire from their state or provincial association about these radio programs in their localities; they are also urged to listen to them and learn the reactions of their farm clients to the information presented.

The February JOURNAL will contain, in so far as possible, a schedule of the broadcasts in the various states and provinces. A list of the subject titles will also be published, together with the names of those who furnished material for the scripts.

The U.S.L.S.S.A. Meeting

The forty-eighth annual meeting of the United States Live Stock Sanitary Association, held in Chicago, Dec. 6-8, 1944, carried out an unusually extensive program of addresses, papers, and committee reports covering the gamut of animal health and its relation to the nation's security and welfare. Under the presidency of J. M. Sutton, of Georgia, the secretarial direction of R. A. Hendershott of New Jersey, the other officers, committees, and patrons, the meeting signalized the prominence of livestock sanitary work as a war effort. The major health problems confronting all branches of the nation's livestock interests were dwelt upon by reporters experienced in their respective lines. The program is too long to gazette here, thoroughly as it maps out the animal-disease situation in the United States and Canada, and as much as it recommends much useful police-work which will benefit the two countries.

It was obvious at the meeting that the chief problems facing the livestock sanitarians at this time are: bovine brucellosis, bovine mastitis, swine enteritides, respiratory infections and tuberculosis of chickens, rabies and anaplasmosis. The proceedings of the meeting will be published in book form.

The new officers elected are: *president*, C. U. Duckworth, Sacramento, Calif.; *first vice-president*, Wm. Moore, Raleigh, N. Car.; *second vice-president*, Will J. Miller, Topeka, Kans.; *third vice-president*, J. V. Knapp, Tallahassee, Fla. R. A. Hendershott, Trenton, N. J., was reëlected *secretary-treasurer* for the ensuing year.

APPLICATIONS

The listing of applicants conforms to the requirements of the administrative by-laws—Article X, Section 2.

First Listing

BARRY, FRANCIS A.
Station Hosp., Camp Upton, N. Y.
D.V.M., Cornell University, 1937.
Vouchers: L. A. Corwin and L. B. Fake.

CAMPBELL, A. R.
Hensall, Ont., Can.
B.V.Sc., Ontario Veterinary College, 1923.
Vouchers: H. S. MacDonald and R. A. McIntosh.

CHEN, C. C.
c/o Chinese Embassy, Washington, D. C.
D.V.M., University of Berlin, 1938.
Vouchers: J. G. Hardenbergh and H. W. Schoening.

GISSENDANNER, A. R.
Box 623, Dothan, Ala.
D.V.M., Alabama Polytechnic Institute, 1918.
Vouchers: E. S. Winters and F. P. Woolf.

HICKMAN, H. B.
Malta Bend, Mo.
D.V.M., Kansas State College, 1920.
Vouchers: F. H. Suits and B. Strickler.

JACOBS, LEONARD D.
1312 W. 15th St., Sioux City 17, Iowa.
D.V.M., Alabama Polytechnic Institute, 1940.
Vouchers: M. Brodner and T. A. Moir.

LINT, G. M.
6631 S. California Ave., Chicago, Ill.
D.V.M., McKillip Veterinary College, 1920.
Vouchers: M. J. Romine and M. J. Thompson.

STIERN, RICHARD
1012½ N. Sultana, San Gabriel, Calif.
D.V.M., Washington State College, 1944.
Vouchers: T. H. Coffey and E. C. Baxter.

THOMPSON, A. W.
118 S. Minnesota St., Prairie du Chien, Wis.
D.V.M., Chicago Veterinary College, 1917.
Vouchers: H. W. Jacobson and G. B. Munger.

TINSMAN, R. E.
148 Monhagen Ave., Middletown, N. Y.
D.V.M., Colorado State College, 1933.
Vouchers: G. F. Schroeder and C. E. Hartley.

Second Listing

Brenny, Raymond N., Veterinary Station Hospital, Ft. Des Moines, Iowa.
Converse, James M., P. O. Box 377, Mayfield, Ky.
Engel, A. J., Frankenmuth, Mich.
Fox, G. M., 214 Bridgeway St., Aurora, Ind.
Johnson, Peter V., R.F.D. Box 48, Ashland, Mass.
Johnston, E. F., Carp, Ont., Can.
McClung, H. E., 22579 B St., Hayward, Calif.
Manning, M. M., Yale, Iowa.
Ruck, Richard A., Base Veterinarian, AAF Dispensary (non-tactical), Nashville Municipal Airport, Nashville, Tenn.
Swick, Calvin A., Station Veterinarian, Camp Callan, San Diego 14, Calif.

1945 Graduate Applicants

First Listing

The following are graduates who have recently received their veterinary degrees and who have applied for AVMA membership under the provision granted in the Administrative By-Laws to members in good standing of junior chapters. Applications from this year's senior classes not received in time for listing this month will appear in later issues. An asterisk (*) after the name of a school indicates that all of this year's graduates have made application for membership.

Cornell University

SANTIVANEZ, JOSE, D.V.M.
301 Bryant Ave., Ithaca, N. Y.
Vouchers: H. C. Stephenson and H. J. Milks.

Michigan State College

BUSH, CHARLES T., D.V.M.
979 39th St., West Palm Beach, Fla.
Vouchers: C. F. Clark and E. S. Feenstra.
MILLER, PAUL T., D.V.M.
Rt. No. 2, Box 105, Olivet, Mich.
Vouchers: R. F. Langham and C. F. Clark.
MOOTZ, CHARLES E. JR., D.V.M.
215 S. Rusk, Viroqua, Wis.
Vouchers: R. F. Langham and C. F. Clark.
SIEGMUND, O. H., D.V.M.
215 S. Rusk, Viroqua, Wis.
Vouchers: R. F. Langham and C. F. Clark.

Second Listing

Texas A. & M. College

Champion, C. L., D.V.M., Jefferson, Texas.
Holbrook, Leo C., D.V.M., Rt. 2, Box 363, San Antonio, Texas.

School children have sold over a billion dollars worth of War Bonds and Stamps—And, the old folks did not do so bad either.

COMMENCEMENT

Iowa State College

At the commencement exercises of Iowa State College, on Aug. 26, 1944, Dean H. D. Bergman presented the following candidates for the degree of Doctor of Veterinary Medicine:

Boll, Louis F.
Bowstead, Tom T
Butson, Wallace J.
Chapin, Wayne F.
Chapman, Gerald E.
Collins, Warren E.
Dale, Eldon
De Valois, Donald G.
Doyle, Keith A.
Dullum, Robert E.
Engelbrecht, H. J. H.
Gibbs, Roland J.
Gooch, John M.
Griswold, David M.
Habluetzel, Jack E.
Hancock, Samuel E.
Holden, William E.
Hollen, Robert M.
Hopkins, Elvin J.
Horning, Melvin A.
Howe, Ralph C.
Jorgensen, Jerald P.
Kingrey, Burnell W.
Kleaveland, Rodney C.
Lang, Allen N.
Lundvall, Richard L.
Magnall, Lawrence J.
Malmquist, Winston A.
McCracken, Donald D.
McIntosh, Arthur J.
McMannus, Edward C.
McMillan, Mac H.
Meerdink, Peter B.
Merkley, Robert M.
Mittelsted, Gale W.
Mott, Richard E.
Nelson, Norman M.
Nims, Robert M.
Norton, Robert E.
Nuessen, Paul J.
O'Donnell, Francis C.
Peterson, Irvin E.
Philbrick, Robert E.
Pick, Elmer H.
Puckett, Ferrell L.
Reight, Robert J.
Reinhart, Virgil M.
Ruebel, A. Kenneth
Ryan, N. Thomas
Sceli, Donald E.
Sedlacek, Glen E.
Seymour, M. Robert
Spesard, David E.
Strohbehn, Alvin R.
Sweeney, Donnis E.
Tietz, William G.
Turbes, Calvin C.
Weber, Alvin F.
Wehler, Duane R.

The honor student in veterinary medicine was Richard L. Lundvall. Dr. Lundvall thereby became the winner of the George Judisch Award.

The winners of the G. G. Graham Awards—based on the records of the students' work in clinical practice were: First Prize, Dr. Richard L. Lundvall; Second Prize, Dr. Winston A. Malmquist.

U. S. GOVERNMENT

Animal Transport on the Rhine.—Commentator Collingwood, CBS broadcaster, in Paris, featured his talk of December 1, with remarks on the growing use of animal transport by the American troops operating along the Rhine. The December JOURNAL (page 445) readers will recall brief mention of the Liberty ships that are being fitted for transporting mules oversea. Those charged with the tremendous responsibility of supplying troops in action,

will understand that necessity, not zoöphilia, or faith in machines, governs their requisitions. Among troops engaged in a desperate operation, there is nothing quite as despairing as the ammunition that does not come.

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BAI Film on "Vesicular Diseases of Animals" Now Ready

The U. S. Bureau of Animal Industry has announced the availability of a new film on "Vesicular Diseases of Animals," which was prepared by the Pathological Division to aid in the prompt and accurate diagnosis of vesicular stomatitis, vesicular exanthena, and foot-and-mouth disease. (See discussions of these diseases by J. Traum and H. W. Schoening elsewhere in this issue).

The film is designed for showing to veterinarians and other professional groups. It is one reel, sound, 16 mm., in color, and requires about 12 minutes for projection. Professional groups may obtain loan of a copy of the film without charge aside from moderate cost of return transportation. Requests should be addressed to the Pathological Division, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C., and should be signed by a representative of the professional group desiring the loan of the film. Requests should reach Washington at least ten days before date of showing.

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The American Meat Institute places the amount of federally inspected beef and veal in August, 1944, as the highest on record—600,000,000 lb., or 21 per cent more than for the same month in 1943, but pork was 19 per cent lower.

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In a report for October, 1944, Director James F. Byrnes of War Mobilization gives 6,000,000 tons as the amount of food in storage for the armed forces for the first half of 1945, or 2,100,000 more tons than the estimated needs, more, for example, than enough to feed the people of Michigan for a year.—*From Food Industries.*

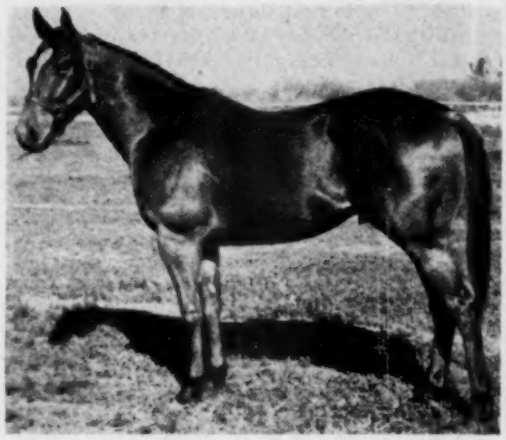
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Asks New Penicillin Regulations.—The Food and Drug Administration is reported to be petitioning Congress to amend the food, drug, and cosmetic act so as to prohibit the distribution of penicillin prior to submitting a sample of each batch to the FDA for approval as is now done with insulin. At the present time, the manufacturers do so voluntarily.

AMONG THE STATES

Arizona

The 25-Sunday meet of the Tucson Racing Association will close its 1944-1945 season January 28 with the "Arizona Derby", a 1/4



—*From Blood Horse*

"Piggin Strings," a Thoroughbred quarter horse.

mile race for 3-year-olds and February 4 with the "World's Champion Quarter Mile" the feature race.

California

Studies Parasites in South America.—Dr. Morris A. Stewart, associate professor of parasitology at the College of Agriculture of the University of California, has returned to the university after three months spent in South America, chiefly in Bolivia, as consulting parasitologist to the Government. In Bolivia, Dr. Stewart set up a public health service and a service for the protection of domestic animals, making the necessary surveys and getting the work under way. He had his headquarters in Santa Cruz, where at the Instituto Superior de Medicina Veterinaria and the Instituto Orientale de Biologia he was made honorary professor of parasitology. He spent several weeks traveling through jungles and over other parts of Bolivia. He also made a study of parasitic diseases in Rio de Janeiro and in Sao Paulo, Brazil, and attended conferences in Peru on plague epidemic conditions.—*Science, Oct. 27, 1944.*

Food Inspected.—Over 21,500,000 lb. of meat and dairy products are inspected daily in continental United States by the Veterinary Corps personnel.

Personal.—Dr. Samuel Hodesson has announced the opening of the Garvey Veterinary Hospital at El Monte, offering complete veterinary service for all animals.

Canada

Personal.—K. H. Thompson (Ont., '31) has resigned his position with the B.C. Government to enter private practice in partnership with Dr. J. G. Jervis, of Milner, B.C.

Florida

Capt. Willys Lord (O.S.U., '34) of Miami is among the veterinary officers on duty with the Y-Forces in China, Burma, and India. He is serving with the Chinese forces in western Yunnan, where he participated in the difficult Salween campaign in the capacity of teaching Chinese officers and soldiers the American method of caring for the animals which were indispensable for transportation on the rugged terrain of the Kaoli Kung mountains. Captain Lord formerly lived in North Dakota, but practiced in Miami for several years before entering the military service.

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Personal.—Lt. Col. J. G. Catlett, whose home is Miami, is confined to the Walter Reed Hospital due to conditions contracted in the CBI theater.

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Personal.—Lt. Col. H. M. Clarvoe has returned to the state and is at his former home in Tampa. He served in administration with the 459th Bomber Group of the 15th Air Force.

Illinois

Dairy Cows Rescue Jerseyville Girl.—When a school girl, Barbara Cain, daughter of a Jerseyville farmer, was viciously attacked by two sows, she was rescued by the intervention of two dairy cows. From the *St. Louis Globe-Democrat*, we quote:

"Barbara Cain, 6, daughter of Mr. and Mrs. John Cain, Jerseyville farmers, is recuperating from a recent attack by two vicious sows, from which she was saved when two cows drove off her assailants.

"Barbara, home from school because of a cold, was permitted to go to a pasture to be with her father. As she passed through the pig sty, the sows attacked. She attempted to climb into a chicken house which stands three feet above the ground, but one of the sows grabbed her by the ankle and dragged her back.

"At this point, the other sow joined the attack and the two inflicted lacerations on her arms and legs, six of them deep in the muscles. Barbara's parents heard her screams and ran to her assistance, but when they arrived they found the cows had reached the scene first and driven off the sows. The cows even resented Cain's picking up his daughter."

s/ANTHONY E. BOTT, East St. Louis, Ill.

• • •

Central Association.—At a dinner session of the Central Illinois Veterinary Medical Association at The Mill, Springfield, on Nov. 30, 1944, Glen D. Grogan, Peoria, presented the subject of "Nutritional Deficiencies," and a film on clinical cases made up by the state university was shown.

s/C. C. HASTINGS, *Secretary*.

• • •

State Association.—The sixty-third annual meeting of the Illinois State Veterinary Medical Association will be held at the Leland Hotel, Springfield, Jan. 18-19, 1944. Secretary Hastings urges early procurement of hotel reservations. No advanced information on the program has been received.

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Mississippi Valley Veterinary Medical Association.—The annual meeting was held Nov. 15-16, 1944, at Galesburg. The following program was presented:

C. E. Fidler, Springfield: "Abortion Control Program."

W. L. Boyd, St. Paul, Minn.: "Nutritional Deficiencies as Related to Causes of Diseases," and "Important Nutritional Diseases of Food Producing Animals."

James Farquharson, Ft. Collins, Colo., president of AVMA: "Veterinary Organization."

R. C. Klussendorf, Columbus, Wis.: "Digestive Problems of Calves."

T. L. Steenerson, Wilkinson, Ind.: "Diseases of Swine."

A. R. Cowser, Farmington: "Entero-Hepatitis."

R. E. Ruggles, Moline: "Present Day Problems in Small Animal Practice."

J. D. Ray, Omaha, Neb.: "Swine Erysipelas."

The program concluded with a question box, conducted by J. D. Ray.

The ladies' auxiliary held its annual meeting at the same time, with the business session, election of officers, and social functions being the main features.

• • •

Vivisection Furor.—Scientific medical study in Chicago has just survived the wrath of the supersentimental champions of the canine species. The attempt to stop the allocation of impounded dogs to local research laboratories through action of the City Council failed to materialize. The measure was backed by the Hearst paper—the *Herald American*—and opposed by the *Tribune* which said among other things: "There comes a time when patience

with people like this ceases to be a virtue. It is no excuse to plead for them that they are sincere. So, probably, is Hitler, who is no crazier than the antivivisectionists."

The veterinary profession's position on this everlasting debate is that the Creator put animals among us that we may survive. All that is expected of man is that he give them a square deal and conduct experiments in a humane fashion.—*L.A.M.*

• • •

The Incidence of Goiter.—The final tabulation of the incidence of goiter among the draftees of World War I gives the ratio of 7.9/1,000, in 2,510,701 examined. Incomplete figures for World War II show a ratio of 4.1/1,000. As of the last war, the state was twelfth among the other states. Because the incidence of goiter is higher in females, these percentages are not accurate for the total population.—*Illinois Health Messenger.*

• • •

When Governor Green vetoed the bill authorizing pari-mutuel betting at light-harness races, the advocates of the cleanest and probably the most useful of all sports were astonished at the partiality shown for the Thoroughbreds, of which the pari-mutuel is the main support. The racing of trotters and pacers is largely a country sport. But, says the *Thoroughbred Record*, "The prediction is made that he (the Governor) will not do so again if confronted with the same measure."

Indiana

Brucellosis on the Air.—Assistant Pathologist L. M. Hutchings, Purdue University, told the radio audience of WLW (Cincinnati) how brucellosis in swine should be handled. The broadcast was one of a series of talks on "Keep 'em Healthy," conducted by that station under the direction of Earl Neal, manager of the station's farm, who has coöperated warmheartedly in the radio programs of the veterinary medical associations of Ohio, Indiana, and Kentucky.



Farmer Neal, radio program manager and Animal Pathologist Hutchings (right), of Purdue University.

• • •

Personal.—Dr. Max R. Zelle, assistant professor of animal genetics, Purdue University, has been granted a leave of absence to accept a commission in the U. S. Navy.

Kentucky

Personal.—Dr. Clifford Westerfield is resigning his position as assistant professor of veterinary anatomy at the College of Agriculture and Home Economics, University of Kentucky, at the close of this quarter, to accept the position of associate pathologist in the Department of Animal Pathology, Kentucky Agricultural Experiment Station.

Maryland

War Veteran Poultrymen.—Dr. M. A. Jull of the state university tells the readers of *Poultry Tribune* (Nov. 1944) that G. I. Joe had better not look to chicken and egg production as a postwar occupation since that industry may suffer some rather severe reconversion pains. The enormous expansion of poultry raising developed during War War II is not likely to ease itself back to the peacetime level as it did after World War I during which there was no comparable expansion of poultry production. In Great Britain, returning soldiers are already prohibited from going into the chicken business. Dr. Jull points out that while some veterans of the last war became quite successful poultrymen, the tremendous expansion of World War II should be a warning rather than a lure.

Massachusetts

State Association.—The Massachusetts Veterinary Medical Association held its November meeting at the Hotel Vendome, Boston. The following program was presented:

C. M. deVarennes, Quincy: "Cecectomy in the Dog."

Leo Weisz, Natick: "Equine Colics."

M. M. Kaplan, Auburndale: "Listerellosis in Domestic Animals with a Case Report from Massachusetts."

s/H. W. JAKEMAN, *Secretary.*

Mexico

E. E. Warren, Ohio veterinarian, known in the racing circle as a specialist on fractured hoofs, is practicing for the winter among the Thoroughbreds of Mexico City.—*From The Thoroughbred Record.*

Missouri

Annual Short Course.—The twentieth annual short course for graduate veterinarians at Columbia, Nov. 9-10, given under the direction of the Department of Veterinary Science, University of Missouri in coöperation with the Missouri Veterinary Medical Association, was attended by 104 busy veterinarians. The program included the following discussions and special lectures:

W. A. Albrecht, University of Missouri: "Soil and Its Relation to Disease."

H. C. Smith, Allied Laboratories, Sioux City, Ia.: "Hemoglobin Determinations and Blood Transfusions in Anaplasmosis" and "Chemotherapy of Anaplasmosis."

W. F. Guard, Ohio State University: "New Things in Large Animal Practice" and "Practical Field Veterinary Surgery."

W. H. Boynton, University of California: "Hog Cholera and Its Control" and "Virus Diseases of Farm Animals."

A. J. Durant, University of Missouri: "Poultry Diseases."

Cecil Elder, University of Missouri, led a panel discussion on "Veterinary Practice," which was participated in by Drs. Boynton, Durant, Guard, Smith, S. W. Haigler, J. P. Miller, and F. H. Suits.

J. L. WELLS, *Resident Secretary.*

New Jersey

Walker-Gordon Returns to Independent Status in Certified Milk Production.—Henry W. Jeffers, Sr., chairman of the board of Walker-Gordon Laboratory Co., Inc., Plainsboro, N. J., and an honorary member of the AVMA, announced on Dec. 1, 1944, that the company would operate in the near future as an independent organization in the field of certified milk production after nearly fifteen years as a unit of the Borden Company. Organized in 1891, the Walker-Gordon system of scientific milk production became famous for its development of many fundamental improvements in quality milk production on a volume basis, including a highly specialized system of medical, veterinary, and laboratory supervision on its farms. The company will continue its program of research under the new set-up, particularly in respect to the nutritional qualities of milk and the feeding of dairy cattle.

New York

New York City Association.—**Earl S. Markham,** president of the state veterinary medical society, was the guest speaker at the November 1 meeting held at the Hotel New Yorker. His subject was "The New York State Society." **L. J. Goss,** exhibited a sound film entitled "High Over the Border." The collection to swell the New York War Fund, Inc., brought $138.00. A movement was started to make a survey of the "causes of death among small animals." An invitation to obtain Dr. Schnelle of the Angell Memorial Hospital was proposed. Dates were set for the January and February meetings. The latter was set for January 31, to accommodate President James Farquharson of the AVMA. C. P. Zepp reported on the favorable action of various health authorities on rabies vaccination but pointed out that the stray dog remained the main problem in rabies control. He spoke in behalf of the movement to redistribute postwar medical supplies directly to professional men rather than through dealers.—*Condensed from the secretary's release.*

• • •

Major C. Dexter Ebertz (Corn., '35) of New ark is on duty with the Y-Forces attached to the Chinese Army. He joined the military service in 1942 and arrived in India in January, 1943, whence he was sent to China to teach Chinese officers and soldiers the care of transport animals for the rugged mountain terrain of the Salween campaign, where pack animals are indispensable. Major Ebertz served on a purchasing board which bought some 800 animals in the Yangtze Valley for the American and Chinese forces. He is an expert skeet shooter, experienced in the training of field-trial dogs, a member of the State association and the AVMA, and just now (Oct. 1944) is on duty in range of Jap guns.

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Personal.—Merrill Goodman (Corn., '43), will start a mixed practice at Washingtonville, Jan. 1, 1945.

North Dakota

Livestock Sanitary Board Report.—The 37th and 38th annual reports of the North Dakota Livestock Sanitary Board to the Governor, is a 57-page booklet revealing the animal-health situation of the state and the control work in operation. The personnel of the Board consists of J. W. Robinson, Garrison, *president;* John Dawson, Mandan, *vice-president;* J. F. Hinz, Lidgerwood, *secretary;* and Harrison A. Thezton, *member.* J. O. Foss, bacteriologist and consulting veterinarian, State College Station; and T. O. Brandenburg, executive officer and state veterinarian, are *ex officio* members. Activities in the field, laboratory, sales rings, and stockyards are described and tabulated. The veterinary profession of the state is composed mainly of overworked old men. The few young men who have come into the state are working full time for the Livestock Sanitary Board. Thus, is stressed the shortage of gradu-

ate veterinarians. The principal diseases tabulated in the order of incidence are: foot rot, blackleg, calf scours and pneumonia, influenza, actinobacillosis, malignant catarrh in *cattle;* malignant edema, encephalomyelitis and anthrax in *horses;* infectious keratitis in *sheep;* and cholera, enteritis, erysipelas, and anthrax in *hogs.* The most perturbing disease problems are anthrax, swine erysipelas, bovine brucellosis and malignant edema.

Ohio

Dr. Walter Shaw, 90, pioneer American veterinarian of Dayton announced his retirement *(Dayton Daily News,* October 2) in October, after 64 years in practice, 58 at Dayton. Born at Simcoe, Ont., Nov. 26, 1854, he was graduated at the Ontario Veterinary College in



Dr. and Mrs. Walter Shaw, pioneers of the veterinary service in the Buckeye state. Writes a daughter, Mrs. T. Dickson Brown, Jr., "At 85, mother has no gray hairs."

1881 and served for eighteen years as one of the nonresident members of the Board of Examiners of his alma mater. Besides distinguishing himself for building up a large practice, Dr. Shaw found time to promote the founding of the Ohio State Veterinary Medical Association, which he served as president on two occasions and as a member of the state Board of Veterinary Examiners for a term of eight years (1902-1910). Dr. Shaw's retirement ends the kind of professional life that laid the foundation upon which the profession was erected in the United States and Canada—a life characterized by high standards of ethics and citizenship. The Doctor has been a life member of the AVMA.

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Personal.—S. W. Stout, of Hamilton, was the guest speaker on the "Keep 'em Healthy" series, over station WLW on "Everybody's Farm Hour," December 9. Dr. Stout's subject was "Blood Testing of Poultry."

Oklahoma

Livestock Conservation and Production Clinic.—The First Oklahoma Livestock Conservation and Production Clinic held in Oklahoma City, Oct. 20-21, 1944, was the initial step of a far-reaching program on the development of the livestock industry. Hon. Robert S. Kerr was the *clinic chairman;* Roy J. Turner, of the Turner Ranch, Sulphur, the *clinic director;* and Glenn W. Faris, of the Oklahoma City Chamber of Commerce, the *clinic secretary.* The conference was sponsored by the Governor, the A. & M. College, the State Agricultural Experiment Station, the State Instruction and Extension Services, the State Department of Vocational Agriculture, State Board of Agriculture, U. S. Bureau of Animal Industry, Oklahoma Livestock Conservation Council, and the Oklahoma City Chamber of Commerce. The scope of the objectives is indicated in the following program; Governor Kerr, presiding.

Hon. Robert S. Kerr, Governor of Oklahoma: "Purposes of the Clinic."

Roy J. Turner, Turner Ranch: "The Rules of the Clinic."

Thomas E. Wilson, chairman of the Board of Directors, Wilson & Company, Chicago, Ill.: "What the Future Holds for the Livestock Industry in Oklahoma."

J. G. Hardenbergh, executive secretary, American Veterinary Medical Association, Chicago, Ill.: "Latest Developments in Livestock Disease and Parasite Control." Discussion lead by **Shawnee Brown,** director, Agricultural Extension Service, Oklahoma A. & M. College, Stillwater.

H. G. Bennett, president, Oklahoma A. and M. College, presided at the luncheon session.

Charles E. Snyder, editorial director, the *Corn Belt Farm Dailies,* Chicago, Ill.: "Will There Always be a Livestock Industry?"

Hon. O. B. Ellis, farm manager, Board of Shelby County Commissioners, Memphis, Tenn.: "Livestock's Part in Reclaiming Misused Land."

SHEEP SECTION

Col. E. N. Wentworth, director, Livestock Research Bureau, Armour & Company, Chicago, Ill.: "Factors Influencing Successful Sheep Production."

C. H. Fauk, U. S. Bureau of Animal Industry, Oklahoma City: "Reducing Losses by Control of Diseases and Parasites."

Roscoe Kieffer, sheep breeder, Helena: "Pastures for Sheep in Oklahoma."

H. M. Briggs, professor of Animal Husbandry, Oklahoma A. and M. College, Stillwater: "Oklahoma Feeds for Sheep with Emphasis on Proteins."

Leo Gilbert, Commercial Sheep Producer, Lamont: "Reducing Losses at Home and to Market."

SWINE SECTION

Will J. Miller, secretary, Kansas Livestock Association, Topeka, Kan.: "More Profitable Hog Production."

C. H. McElroy, head, Department of Veterinary Science, Oklahoma A. and M. College, Stillwater: "Reducing Losses by Control of Diseases and Parasites."

W. R. Felton, district supervisor, Department of Vocational Agriculture, Stillwater: "Pastures Reduce Production Costs."

J. C. Hillier, Professor of Animal Husbandry, Oklahoma A. and M. College: "Hog Rations with Emphasis on Proteins."

J. C. Holmes, Commercial Hog Producer, Laverne: "Reducing Losses at Home and to Market."

O. W. Willham, professor of Animal Husbandry, Oklahoma A. and M. College: "Commercial Improvement Through Breeding."

POULTRY SECTION

Cliff Carpenter, Institute of American Poultry Industries, Chicago, Ill.: "Optimism in Postwar Poultry Planning," and "Reducing Egg and Poultry Losses in Marketing and Processing."

R. B. Thompson, Professor of Poultry Husbandry, Oklahoma A. and M. College: "Economical Feeding Practices."

Harry Mason, Mason's Hatchery, Okmulgee: "Practical Breeding, Hatching, and Culling Methods."

Harry W. Orr, Professor of Physiology and Veterinary Medicine, Oklahoma A. and M. College: "Saving Poultry by Sanitation."

HORSE AND MULE SECTION

Wayne Dinsmore, secretary, Horse and Mule Association of America, Chicago, Ill.: "Trends of Horse and Mule Production in the United States."

Clark Kinkead, assistant county agent, Oklahoma City: "Feeding and Care of Horses for Exhibits."

Thomas E. Berry, jack and mule breeder, Stillwater: "Jacks and Mules."

C. H. McElroy, head, Department of Veterinary Science, Oklahoma A. and M. College: "Keeping Horses Healthy."

DAIRY SECTION

H. A. Ruehe, executive secretary, American Butter Institute, Chicago, Ill.: "What High Quality Produce Means to the Dairy Industry."

Ollie E. Reed, chief, Bureau of Dairy Industry, U. S. Department of Agriculture, Washington, D. C.: "Some Pointers on Profitable Milk Production."

W. W. Rosenberry, state veterinarian, Oklahoma City: "Reducing Losses by Control of Diseases and Parasites."

H. H. Kuhlman, Professor of Dairying, Oklahoma A. and M. College: "Increasing Milk Production Through Pastures."

Ray W. Wilson, National Cottonseed Products Association, Dallas, Tex.: "Economical Rations with Emphasis on Proteins."

V. G. Heller, agricultural research chemist, Oklahoma A. and M. College: "Minerals and Vitamins Are Necessary."

H. C. Olson, professor of Dairy Manufacturing, Oklahoma A. and M. College: "More High Quality Milk and Cream Through Careful Handling."

BEEF SECTION

Dan Casement, cattle producer and feeder, Manhattan, Kan.: "Fundamental Principles of Successful Beef Production."

C. H. Ricks, veterinarian, Sulphur: "Reducing Losses by Control of Diseases and Parasites."

H W. Staten, professor of agronomy, Oklahoma A. and M. College: "Increased Gains and Profits Through Good Pastures."

Reece R. Smith, banker and cattleman, Chickasha: "Making the Most of Oklahoma Feeds with Emphasis on Proteins."

Fred Ahrberg, agriculture agent, Pawhuska: "Reducing Losses at Home and to Market."

E. W. Laake, entomologist, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, Dallas, Tex.: "Treatment of Grub Infestation."

Major General E. B. Gregory, Quartermaster General U. S. Army, Washington, D. C. Banquet address: "Food Fights for Freedom."

OTHER ADDRESSES

Paul G. Adams, Oklahoma Livestock Conservation Council: "4-H Clubs Have Contributed to Disease and Parasite Control."

J. B. Perky, state director of Future Farmers of America: "F. F. A. Boys Have Helped in the Conservation Program."

H. M. Bell, chief, Regional Range Division, U. S. Soil Conservation Service, Fort Worth, Tex.: "Conserving and Utilizing Oklahoma Ranges."

R. C. Pollock, director, National Livestock and Meat Board, Chicago, Ill.: "The Effect of

War on the Consumption of Meat in the Postwar Period."

Col. E. N. Wentworth, director, Livestock Research Bureau, Armour and Company, Chicago, Ill.: "Postwar Livestock Outlook."

Ladd Haystead, president, New York City Farm Club, associate editor *Fortune Magazine:* "Postwar Farming."

Texas

State Association.—The annual meeting of the Texas Veterinary Medical Association held at College Station, Sept. 25-26, 1944, drew an attendance of approximately 200. The officers elected were C. W. Kolberg, San Angelo, *president;* Hubert Shull, Texarkana, *first vice-president;* Capt. W. W. Armistead, U. S. Army, *second vice-president;* E. W. Kupperman, Austin, *secretary-treasurer;* E. A. Grist, *AVMA delegate;* Frank Hecker, W. G. Brock, L. G. Cloud, and T. T. Christain, *AVMA alternates.* Dee Pearce, former secretary-treasurer was unanimously elected an honorary life member, on recommendation of the Board of Directors. Contributors from out of the state were James Farquharson, president of the AVMA; Walter Krill, Ohio State University; F. B. Young, and H. E. Pinkerton, Iowa; A. C. Merrick, Illinois, and A. H. Quin, Missouri.

Wisconsin

Joint Meeting of Southeast and Southwest Wisconsin Association.—The joint meeting was held at the Park Hotel, Madison, Nov. 16, 1944. Dr. James Farquharson, president of the AVMA, addressed the meeting on "Surgery," showing the film "Surgery of the Bovine Eye." The 150 members present voted this an outstanding feature and were all sold on the idea of visual education.

The Southeastern Association elected the following officers for the new year: J. T. Schwab, Oconomowoc, *president;* Robert Curtis, Portage, *vice-president;* J. O. McCoy, Reeseville, was reëlected *treasurer.*

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Personals.—Drs. V. S. Jacobi, of Watertown, and J. B. Collins, of Chippewa Falls, have both recovered from recent illnesses and are back on the job.

JAMES S. HEALY, *Resident Secretary.*

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Course in Dairy Manufacturing.—The University gives an eighteen-week course in dairy manufacturing starting in October with an extra week on dairy sanitation. The cost including meals, room, tuition, fees, and books is $261.00 The course covers ground that aspirants for positions requiring competent milk inspectors will have to study. The trend toward food inspection by veterinarians having specialized training such as the Army has developed can be justified only by the taking of such graduate courses.

Foreign

Brazil

The people of Brazil presented the armed forces of the United States a gift of 52,910,400 lb. of coffee in July (1944). This was presented through U.S. Consul in Sao Paulo, Cecil M. P. Crosse, by President Getúlio Vargas. That, says the announcement in *Food Industry* is coffee for 1,777,789,400 cups.

British Isles

Choosing Medical Students.—A reform too long postponed is the drastic proposal of the British Government Committee of Inquiry into Medical Education to select medical students on the basis of *personality* rather than upon the *passing of examinations.*

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Glasgow's New Principal.—*The Veterinary Record* congratulates the Board of Management, Glasgow Veterinary College, for having chosen Captain Donald Campbell, M.R.C.V.S., of Rutherglen (Scotland), to succeed the late Dr. A. W. Whitehouse as principal of that pioneer college. Captain Campbell was graduated at the Glasgow college in 1908. He is a clinician of note and had four years of service in the Royal Army Veterinary Corps during World War I. He served as president of the Society of Veterinary Practitioners and also of the National Veterinary Medical Association of Great Britain and Ireland, served as Examiner in Medicine of the Royal College of Veterinary Surgeons, and was interim principal of the college since the death of the former principal, Dr. Whitehouse, who was an alumnus of Colorado State College ('10) and Ontario Veterinary College ('94), and who remained in his native land, after serving as a veterinary officer with the A.E.F. of the last war.

India

Development of Agriculture.—The Imperial Agricultural Research Institute and the Imperial Veterinary Research Institute, at a memorable conference held in June, recommended an increase of 300 per cent in milk production; the development of planned research on feeding, breeding, and disease control in cattle; the creation of a Federal Department of Agriculture for the Indian states, charged with fostering animal husbandry and agriculture; and the forming of an agricultural association in every district with local practitioners to link technology with farming.—*From Indian Veterinary Journal, July, 1944.*

Poland

Polish Veterinary Surgeons Association.—A noteworthy eventuality of the war is the "Administration of the Polish Veterinary Surgeons Association in Great Britain." A letter received from the Administration names Prof. J. Kulczycki, *president* and St. Michna, *secretary*, and gives 6 East Fettes Avenue, Edinburgh, Scotland, as the headquarters address. The request to receive the AVMA publication was granted in a letter to President Kulczycki from Executive Secretary Hardenbergh, dated Nov. 14, 1944. Request for back numbers had to be regretfully postponed until after the war.

The communication announces that Polish universities have been destroyed, laboratories and libraries plundered, professors murdered or killed, along with many veterinarians. "We fear that we shall return to Poland with empty hands," the writer declares, in his appeal for help from American veterinarians. Books, journals, and instruments may be sent to the Administration, care of the Royal (Dick) Veterinary College, Edinburgh.

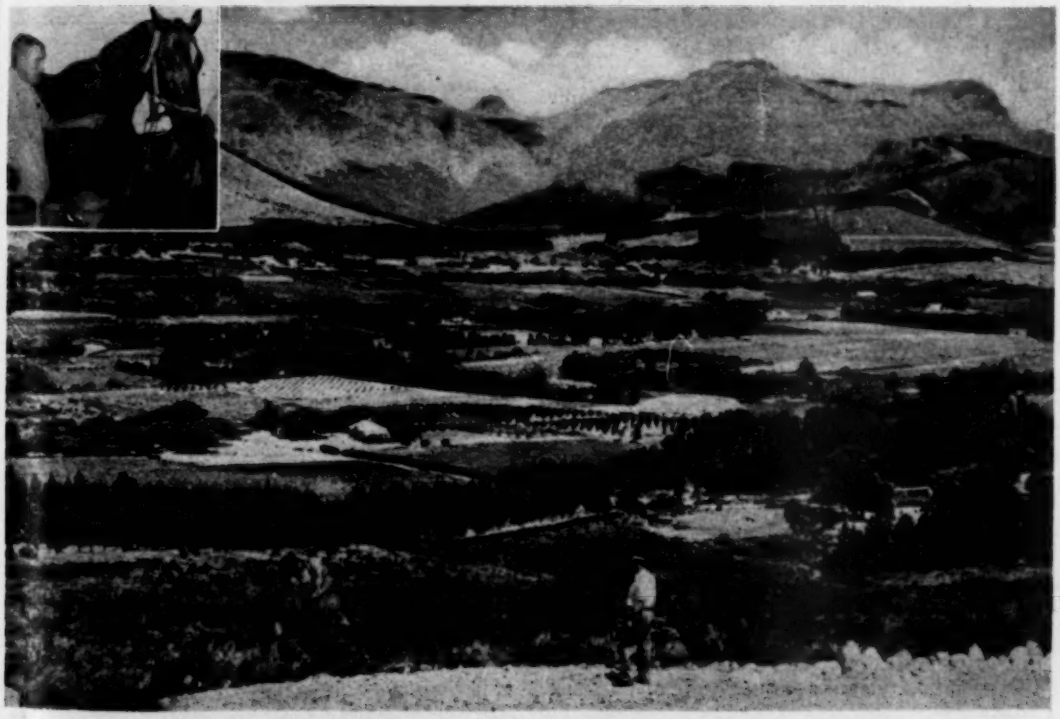
South Africa

Food for Fighting Men.—A beautifully illustrated booklet entitled "South Africa on Service" contains a section on the South African farmers' contribution to the war, particularly in connection with reprovisioning the Allied troops engaged in the North African campaign during which the Axis was driven across the sea, from El Alamein to Rome. Production of the grass plains, crop lands, and orchards played a vital rôle in furnishing food supplies also to the Middle East, Britain itself, and the British Navy, in amazing quantities. Except for the large tonnage of meat and the use of horses in serum production, livestock *per se* are not mentioned.

Venezuela

Officials of the government purchased some 1,500 head of breeding stock in the United States in November. Cattle, sheep, swine, jacks, and jennets were among the procurements. Owing to similarity of climate, most of the purchases were made in Texas. Dr. Gustavo Rivas-Larralde, chief government veterinarian and Martin de Moya, chief animal husbandman of the Department of Agriculture, were the procurement officials.

Rationing is one banned thing after another.



—*From South Africa on Service*

Rural South African landscape. Inset—Diphtheria antiserum production at a South African laboratory.

COMING MEETINGS

University of Pennsylvania. Annual conference for veterinarians, School of Veterinary Medicine, 39th & Woodland Ave., Philadelphia, Jan. 2-3, 1945. G. A. Dick, dean.

Cornell University. Annual Conference for Veterinarians, New York State Veterinary College, Ithaca, N. Y., Jan. 3-5, 1945. M. G. Fincher, New York State Veterinary College, acting dean.

Ohio State Veterinary Medical Association. Deshler-Wallick Hotel, Columbus, Ohio, Jan. 3-5, 1945. R. E. Rebrassier, Ohio State University, Columbus, secretary.

Oklahoma Veterinary Medical Association. Hotel Skirvin, Oklahoma City, Okla., Jan. 8-9, 1945. J. B. Corcoran, 7 N.E. 9th St., Oklahoma City 4, Okla., secretary.

Minnesota State Veterinary Medical Society. Lowry Hotel, St. Paul, Minn., Jan. 8-10, 1945. H. C. H. Kernkamp, University Farm, St. Paul 8, Minn., secretary.

California State Veterinary Medical Association. Annual winter meeting and short course. San Luis Obispo, Calif., Jan. 8-10, 1945. F. P. Wilcox, 4219 Kenwood Ave., Los Angeles 37, Calif., secretary.

Indiana Veterinary Medical Association. Hotel Severin, Indianapolis, Ind., Jan. 9-11, 1945. H. A. Lidikay, Darlington, Ind., secretary.

Wisconsin Veterinary Medical Association. Park Hotel, Madison, Wis., Jan. 11-12, 1945. B. A. Beach, Genetics Bldg., Madison 6, Wis.

Intermountain Livestock Sanitary Association. Newhouse Hotel, Salt Lake City, Utah, Jan. 12-13, 1945. M. L. Miner, c/o Branch Veterinary Laboratory, Provo, Utah, acting secretary.

Illinois State Veterinary Medical Association. Leland Hotel, Springfield, Ill., Jan. 18-19, 1945. C. C. Hastings, Williamsville, Ill., secretary.

Kansas Veterinary Medical Association. Emporia, Kansas, Jan. 22-23, 1945. C. W. Bower, 3119 Stafford St., Topeka, Kansas, secretary.

Iowa State Veterinary Medical Association. Hotel Fort Des Moines, Des Moines, Iowa, Jan. 23-25, 1945. C. C. Franks, 855 31st St., Des Moines, Iowa, secretary.

North Carolina State College. Annual conference for veterinarians, North Carolina State College, Raleigh, Jan. 23-24-25-26, 1945. C. D. Grinnells, State College Station, Raleigh, N. Car., chairman.

Michigan State College. Annual post-graduate conference for veterinarians. School of Veterinary Medicine, Michigan State College, East Lansing, Jan. 24-25, 1945. Ward Giltner, dean.

Ontario Veterinary Association. Royal York Hotel, Toronto, Jan. 25-26, 1945. F. H. S. Lowrey, 2555 Bloor St. W., Toronto, Ont., secretary.

Virginia State Veterinary Medical Association. Hotel Roanoke, Roanoke, Va., Jan. 30-Feb. 1, 1945. E. P. Johnson, Box 593, Blacksburg, Va., secretary.

Kentucky Veterinary Medical Association. Agricultural Experiment Station Farm, University of Kentucky, Lexington, Ky., Feb. 1-2, 1945. F. M. Kearn, 3622 Frankfort Ave., Louisville 7, Ky., secretary-treasurer.

New Jersey Veterinary Medical Association. Hotel Sheraton, Newark, N. J., Feb. 1-2, 1945. J. R. Porteus, P. O. Box 938, Trenton 5, N. J., secretary.

American Public Health Association. Hotel Stevens, Chicago, Ill., Sept. 17, 1945. R. M. Atwater, 1790 Broadway, New York 19, N. Y., executive secretary.

BIRTHS

To Dr. (A.P.I., '39) and Mrs. David E. Gibbs, 2 Hillside Ave., Winchester, Mass., a daughter, Lois Ann, July 18, 1944.

MARRIAGES

Capt. Stanley E. Peters (O.S.U., '38), 292 QM Ref. Co., APO 502, c/o Postmaster, San Francisco, Calif., to Miss Willie Mae McLeese, Nov. 13, 1943.

DEATHS

Robert H. Bardwell (Corn., '26), Lexington, Ky., died May 4, 1944. Dr. Bardwell had been a member of the AVMA since 1927.

Joseph T. Jennemann (C.V.C., '11), 70, died suddenly at his home in St. Louis, Nov. 13, 1944. Dr. Jennemann had been a member of the AVMA since 1920.

Peter I. Kershner (Ont., '91), 74, died of a stroke on Oct. 22, 1944. Dr. Kershner had been a member of the AVMA since 1930.

Herman Kock (Amer., '91), 74, died at his home in Brooklyn of a heart attack, Nov. 24, 1944. He was admitted to the AVMA in 1918.

Leslie D. Pirie (San Fran., '14), 63, Riverdale, Calif., died in November, 1944. Dr. Pirie was admitted to the AVMA in 1915.

John G. Richardson (Amer., '96), 75, Providence, R. I., died Nov. 26, 1944. Dr. Richardson had practiced in Providence for forty-eight years and was active up until the time of his death. He was admitted to the AVMA in 1930.

J. E. Tinder (McK., '15), 50, Brook, Ind., died July 14, 1944. Dr. Tinder was admitted to the AVMA in 1939.

Henry A. White (C.V.C., '88), 80, Wyoming, Ill., died suddenly at his home, Nov. 7, 1944. Dr. White was born in Monmouth County, N. J. and came to Wyoming in 1887 where he lived the remainder of his life. He had been a member of the AVMA since 1918.

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